

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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A New Planer and Matcher.

The Cordesman Machine Company, of Cincinnati, Ohio, are turning out a new combined planing and matching machine, of which we present an engraving. The machine is especially adapted to use in job shops and planing mills. It will surface, tongue and groove, or joint and rabbet, or when desired the cylinder may be arranged so that flat molding, beading, siding and all other similar work can be made to advantage. The machine has ample capacity for all ordinary work, and it will commend itself to wood-workers. The frame, with cylinder and roller-boxes, with the large floor support, is cored out and cast in one piece. Any one familiar with wood-working machinery will know that a casting of this description is best adapted for strength and strain; it also prevents the possibility of getting out of shape in shipping and if not carefully leveled on the floor. As will be seen from the engraving, the bed is of extra length, and is also cast in one heavy and well-braced piece. It is constructed in such a manner as to produce work that is perfectly smooth and true. The bearings on the side of table into which the frame is fitted are four in number, two on each side, and all are 14 inches long. They are provided with inclined jibs, which are fastened by bolts. Should there be any lost motion in the table at any time the operator can, by simply screwing up the bolts, take up all such wear. Owing to the accurate fitting of the table into the frame, it is almost impossible for the latter to become shaky by the action of the feed rolls and from the weight and jar of lumber thrown upon it while the machine is in motion. The table is raised and lowered by means of a vertical shaft, with a crank placed at the top, in close reach of the operator, and by means of it and the index, which is conveniently placed on the side of the machine, it can be adjusted to suit any thickness of lumber up to 7 inches. The cylinder, with journals, is made of a solid cast-steel forging; it is truly fitted and accurately balanced, and is driven by two belts. The cylinder boxes are very large and long, and are self-oiling. Two adjusting pressure bars (one on each side of the cylinder) are placed very near the cut, and will yield to the inequalities in the surface of the lumber, and pieces 6 inches or less in length can be planed with accuracy. The two matcher spindles are ground true and are accurately balanced. They revolve in long cap boxes lined with Babbitt metal. The caps have large oil-cups cast in them. Both upper and lower spindle boxes are connected by a web, and are jibbed to two truly-turned horizontal guide-bars which are securely fastened to the inside of the table. These matcher spindles are so arranged that the wear and strain of the belts are not on the cap side of boxes, and they are therefore held stiffly up to the work before them. These matcher heads are made of composition metal, and, of course, are turned perfectly and balanced, and are supplied with solid milled matcher bits made of the best tool steel.

A very simple and effective chip breaker is fitted to the machine, and by means of it the slivering and breaking out of lumber is prevented. The adjustments of the matcher heads are perfect. They move up and down with the table, or can be adjusted so as to receive different width boards by means of the hand-wheels on the side of the machine. To make changes for planing the full width of the machine, the fence, chip breaker and matcher heads can be taken entirely out of the way in a moment's time. The two upper feed rolls, of forged steel, are 3 inches in diameter. These rolls are driven with a special compound yielding gear, and will permit the rollers to rise to such an extent as to take a $\frac{1}{2}$ or $\frac{3}{4}$ inch cut without becoming disconnected. The rollers are given pressure by steel coiled springs placed at the top of the machine, and controlled by means of hand-wheels which are in close reach of the operator. The two lower adjustable feed rolls are 4 inches in diameter, and made of cast iron, fitted with steel shafts. The feed gear is independent, and so arranged as not to interfere with the cylinder pulley, and will give a strong and steady feed. The counter-shaft is $1\frac{1}{2}$ inches in diameter, and has three hangers. These hangers are designed specially for the machine, and are made in box form with an extra large floor support. They are cored out and cast solid. The boxes are lined with the best metal, and have caps to take up the wear. The machine is made also with both upper and lower feed rolls driven by power. The 26-inch planer built by the Cordesman Machine Company is precisely the same in design as this machine, excepting that the table is not quite so long, nor has it the matcher attachment.

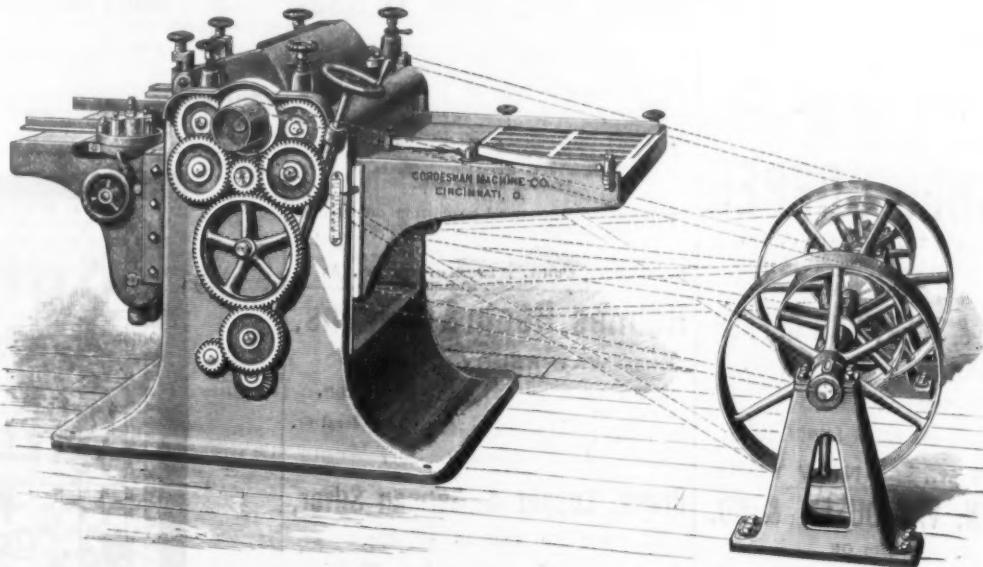
Scientific Experts as Witnesses.

Referring to scientific experts as witnesses, the *Chemical News* says: "The expert occupies a totally anomalous position in court. Technically he is a mere witness; practically he is something between a witness and an advocate, sharing the responsibilities of both, but without the privileges of the latter. He has to instruct counsel before the trial and to prompt him during its course. But in cross-examination he is the more open to insult because the court does not see clearly how he arrives at his conclusions, and sus-

pects whatever it does not understand. The late Dr. R. Angus Smith complained of being 'contemptuously compelled to herd with thieves and scoundrels in a witness-box.' He adds: 'I have seen barristers speaking to a scientific witness in such a way as to show that to them a witness was always an inferior person.' Surely every person who has been present at a technical trial, or has had to appear as an expert in a

public is scandalized; experts are indignant; the bench and the bar share this feeling, but unfortunately are disposed to blame the individual rather than condemn the system. But we fear that this unanimity of dissatisfaction will vanish as soon as a remedy is seriously proposed. To that, however, we must come unless we are willing to dispense with scientific evidence altogether. As it seems to us, the expert should be the ad-

amounts to two machines in one, having upper and lower tables, and two sets of double-gear feed rolls. The slat is run under the lower cutter or single head first, and then turned over and placed on the upper bed beneath the feed rolls, which carries it through the upper or three-sided machine, finishing the slat with the grain. The operator has time to grain his stuff when feeding. The machine is constructed



COMBINED PLANING AND MATCHING MACHINE, BUILT BY THE CORDESMAN MACHINE COMPANY, CINCINNATI, OHIO.

poisoning, a patent or an adulteration case, will be able to confirm this from his own observation and experience.

It may perhaps be cynically hinted that men of science should be willing to bear all this annoyance for the public good. But is it for the public good? In the first place, not a few of the most eminent men in every department of science distinctly and emphatically refuse to be mixed up in any affair which may expose them to cross-examination. "I will investigate the matter if you wish it, and will give you a report for your

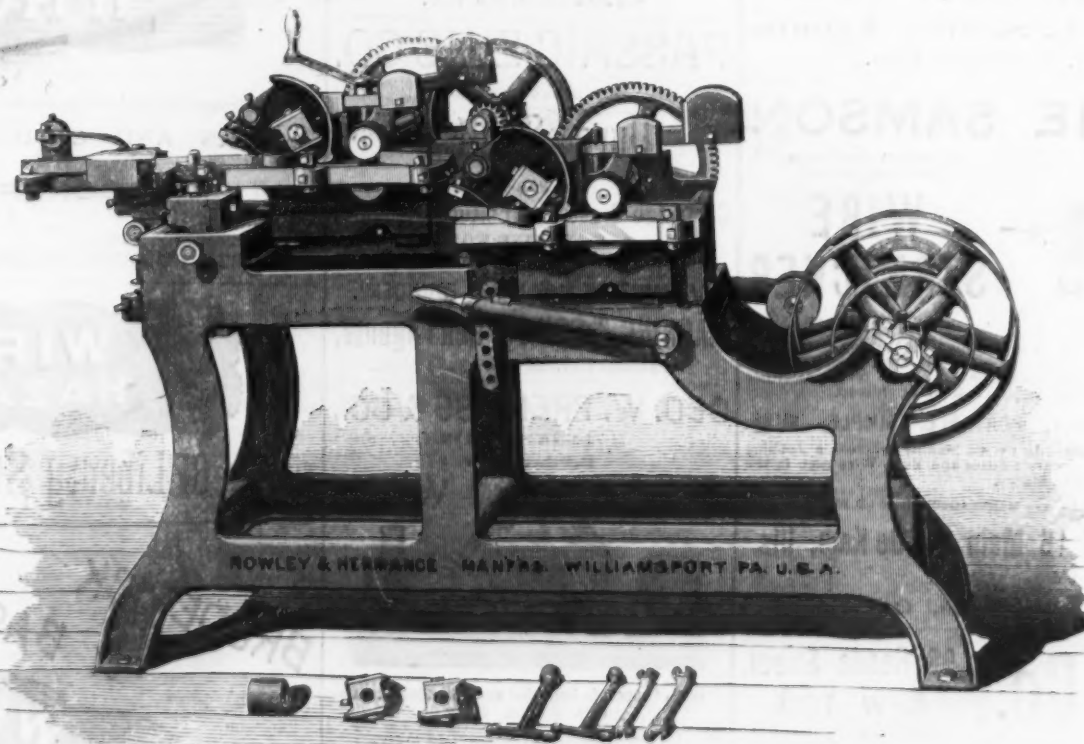
viser of the court, no longer acting in the interest of either party. Above all things he must be exempt from cross-examination. His evidence, or rather his conclusions, should be given in writing and accepted just as are the decisions of the bench on points of law.

Double Blind-Slat Planer.

We show in one of the engravings on this page a new pattern double blind-slat planer which is being manufactured by

with the Rowley & Hermance patent sliding-cap journal box, the advantages of which are generally appreciated. The machine occupies a space 6 feet in length by 2 feet 3 inches in width, and weighs 900 pounds.

The Metropolitan Steamship Company, of New York, have contracted with Cramp & Sons for the construction of an iron steamship to ply between New York and Boston. The new vessel will be 290 feet long, 43 feet beam and 34 feet depth of hold, and is to



DOUBLE BLIND-SLAT PLANER, BUILT BY ROWLEY & HERMAN, WILLIAMSPORT, PA.

guidance, but only on the distinct understanding that I am not to enter the witness-box." Such in substance is the decision of not a few men of the highest reputation and the most sterling integrity. Certainly it is not for the interests of justice to render it impossible for such men to give the court the benefit of their knowledge. Further, the spectacle of two men standing contradicting or seeming to contradict each other in the interest of their respective clients is a grave scandal. Men of the world are tempted to say that "science can lay but little claim to certainty, and is rather a mass of doubtful speculations than a body of demonstrable truth." To us at least there is nothing more saddening than to read the trial of a notorious poisoner, or the report of a great patent case, especially if taken along with the comments of the press and of society on these occasions.

Here, then, we see that our present mode of dealing with scientific evidence is found on all hands unsatisfactory. The outside

Rowley & Hermance, of Williamsport, Pa. This is an improved machine for blind-makers that has just been put upon the market. As will be seen by the engraving, the frame is heavy and is cast in one piece. The machine is strongly geared, and is provided with a powerful feed. The side heads run with long independent belts from the counter-shaft. Objections which have prevailed in other slat planers are overcome in this. The makers state that where slats are finished in an ordinary four-side molder, with one head working against the grain, about one-third of the slats are left rough by tearing out or being wavy. These are very generally thrown away. In order to save this loss many manufacturers run their slats twice through the machine, so as to finish them with the grain. In this machine there is presented a means of planing the slats with the grain by once passing through, thus avoiding the loss of splitting and tearing out, as is the case when one side is run against the grain. Practically it

have compound engines 38 and 76 inches in diameter, with 54-inch stroke. She will be very fast, and will be similar to the steamship H. Dimmock, built by the Cramps some time ago for the same company. She will be named after Herman Winter, the superintending engineer of the line and Secretary Whitney's naval expert.

The petroleum wells in China occurring in the province of Szechouen are thus referred to by L'Abbé Huc: "When a salt well has been dug to a depth of 1000 feet a bituminous oil is found in it that burns in water. Sometimes as many as four or five jars of 1000 pounds each are collected in a day. This oil is very fetid, but it is made use of to light the sheds in which are the wells and the cauldrons of salt. The mandarins, by order of the prince, sometimes buy thousands of jars of it, in order to calcine rocks under water that render navigation perilous."

Japanese Engineering.

Before leaving Japan Prof. J. A. L. Waddell, late professor of engineering at the Government University of Tokio, delivered an address by invitation before the Engineering Society, in which among other things he discussed certain classes of Japanese engineering work. The first topic was the common country roads, a subject which even in this country requires urgent attention. The cause of their unsatisfactory condition has been, "and to a great extent still is, that the building and maintenance of these roads are not left to engineers, but are intrusted to subordinate officials, who have not been educated for such work. Instead of raising the roadbed above the natural surface of the country and avoiding cuttings wherever possible, they have dug it from 1 to 3 or 4 feet deep, making the road act as a drain for the surrounding country. Not content with attracting as much water as possible to the road, they have endeavored to keep it there by planting close alongside rows of trees with thick foliage, or dense bamboo groves, that most effectually keep off both sunshine and wind, the two great natural maintainers of good roads. Too often even on the better class of roads the side ditches are either omitted altogether or are allowed to fill up, or are not made large enough. Within the last three or four years I have noticed a great improvement in the streets of the Tokyo-fu, but outside thereof the condition of the roads is very little better than it was when I first came to this country. The city streets of the Kyoto-fu are in a wretched state, owing to the fact that large unbroken stones are employed for surfacing."

After suggesting methods of improvement, the author said: "I cannot too forcibly impress upon you the necessity for having good common roads throughout the country. They will pay for themselves in a couple of years. They will prove equally advantageous to the people of the country and to those of the towns and cities, increasing the load per vehicle or per man at least threefold, and reducing greatly the market price of country produce. By their means the prices at which Japanese produce and manufactures can be delivered at foreign ports will be so reduced as to enable the people of Japan to compete with those of other countries in lines hitherto untied. For military purposes good roads in connection with a complete railroad system are an essential, and their existence would reduce the necessary size of the standing army to one-half, thus lowering the taxes for the maintenance of the army and adding to the producing number of the population."

On retaining walls Professor Waddell remarked as follows: "The retaining walls of this country, till lately, have been to me a matter of wonder and surprise. Built as they are of single vertical rows of stones shaped into truncated pyramids, how they stand has puzzled me beyond measure. The explanation of the phenomenon was made apparent a short time ago by a wall in Yokohama, and it is a very simple one, viz., that such walls do not stand for any great length of time. Their standing at all would upset any theory of earth pressure if such a theory still existed." The professor then advises that the empirical rules laid down by the competent authorities be used.

"In respect to railroading," continues the professor, "I would direct your attention to the study of some better means of removing earth than that at present employed, viz., by hoeing or shoveling it into a rope mat which is slung on a pole and carried by two men. Such a method cannot be economical. If man power must be employed for removing the material, it would be much better to use wheelbarrows for short hauls and carts or wagons on tramways for long ones. The methods of pile driving still in use are rather crude and inefficient. In locating lines of railway along the valleys of rivers I notice a proneness to cut into the feet of the side hills in order to avoid confining valuable rice land. There is no true economy in so doing, for the hills may develop a tendency to slide; besides, in respect to maintenance, embankments are far more satisfactory than excavations."

"In regard to river improvements, I would suggest a thoroughly scientific study of the physics and hydraulics of the Japanese rivers, and the more effective protection from flood of the river-bottom farm lands by levees. That the Japanese rivers are unusually hard to control there is no denying; consequently, the subject demands even more careful investigation than is given it in other countries. It is possible that in some parts of Japan the movable dams, which are becoming so common in Europe and America, may be advantageously employed for the improvement of river navigation. The highway bridges of this country are still rather primitive. One of the principal objections thereto is the shortness of the spans, necessitating the use of so many piles that the water-way is often impeded to such an extent as to cause the destruction of the bridge by wash-out. This is a common mistake in new countries. The best kind of road bridge for any locality in Japan is rather difficult to determine. For cities, especially at the crossings of large rivers or rapid streams, I would in every case recommend iron bridges of the American type. For remote country districts perhaps the wooden

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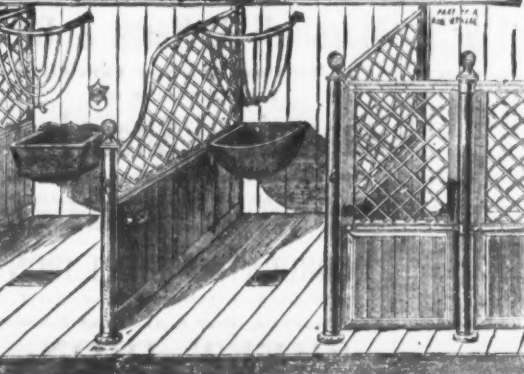
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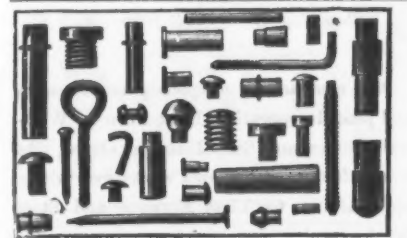
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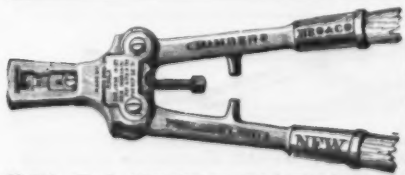
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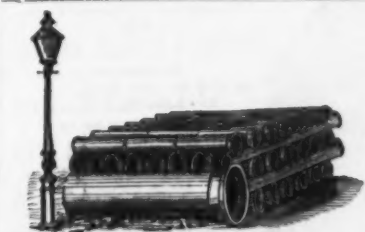
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Howe truss bridges are the best, though in America I would recommend them only as temporary structures in districts where iron is expensive and timber is very cheap. The timber should in all cases be well seasoned. Concerning railroad bridges I have but little to add to what I have said in my "Memoir," except to suggest that you give the system which I advocate a trial. Professor Waddell continues by noting two or three later improvements in bridge construction which do not appear in his "Memoir," and also presents some suggestions on piers and foundations of bridges, and especially advises the study of foreign works on the subject. As the only remedy against the teredo navalis is creosote oil, he advocates the establishment of gas works in the principal cities for the sake of the valuable residual products.

New Gold Fields.

The Kimberly fields, in Western Australia, are beginning to send nuggets in to Sydney. Some of these run from half an ounce up to 100 ounces. The gold is only slightly water-worn, so it cannot have traveled far from the quartz where it originated. According to the *Mining and Scientific Press*, a rush has already set in from Western Australia and from New South Wales. Large numbers of diggers, storekeepers and others have found passage round westward, while others from Victoria, New Zealand, &c., have arrived in Sydney, whence steamers are being specially laid on, most of which will call at the Queensland ports en route to pick up additional miners. The two places of debarkation are Port Derby (King's Sound) and Cambridge Gulf. It is stated by some parties that this will be the largest gold field in Australia. It has been estimated by Mr. Hardman, the Government Geologist of Western Australia, that an auriferous area of country, extending over some 3500 or 4000 miles, exists. The latest information is a telegram from Perth, which states that a miner named Morgan has returned to Port Derby with a large quantity of gold, including a nugget weighing 2 1/2 pounds of solid gold.

The newly-discovered Patagonia gold field extends from Cape Virgin, on the northern shore of the Strait of Magellan, along the Atlantic shore some 50 miles. The gold country is easily accessible, and the deposits are known to be rich. There is a gold field also in the Transvaal, South Africa. In the closing week of last year 2560 ounces of gold were received at Natal. Further north rich deposits of gold and baser metals have been found south of the Zambezi. This region is but little known to white men, but if it is as rich as represented, tens of thousands of white miners will soon be in Central Africa. Northern Thibet is another region which is known to contain vast quantities of gold, which will very soon be extensively worked. It is an upland region, with underlying rock, and there is from 16 to 20 feet of soil, all of which is auriferous. Then there is gold in abundance in Manchuria. This is a region in China, near the Russian possessions. From Madagascar reports come of wonderful finds. As all these places are at great distances from us, it is difficult to get any definite information concerning them. The further gold fields are away the richer they appear to be to those who read of them. To none of these places mentioned has a poor man any business to go, with only money enough to pay passage to the fields.

The Navigation of the Warrior River.

Some time since the *Manufacturers' Record* questioned the practicability of utilizing the Warrior River as a means for cheaply carrying coal, iron and steel to the Gulf. Mr. W. C. Jemison, mayor of Tuscaloosa, Ala., addressed a letter to Col. Horace Harding, U. S. engineer in charge, of the improvement of the Warrior River, calling attention to the statement alluded to. Colonel Harding has replied to it at length. We extract from that reply the following: It may prove interesting and instructive to compare the navigable season of the Warrior with that of the Ohio, and I accordingly give below a table of three columns, of which No. 1 shows, from the records of 22 years, the average number of days in each month during which the Ohio, at Pittsburgh, had 6 feet and over in its channel. No. 2 shows the corresponding table for the Warrior in 1885, and No. 3 the number of days for the same year during which a 10-foot depth existed. I think the year 1885 gives a little better showing for the Warrior than a just average, but I use that year as it happens to be the only full record that I have at hand:

	No. 1.	No. 2.	No. 3.
January.....	18	31	34
February.....	16	28	28
March.....	25	31	32
April.....	26	30	30
May.....	17	25	12
June.....	8	30	28
July.....	5	17	..
August.....	4	10	8
September.....	5	5	3
October.....	5	30	30
November.....	9	30	30
December.....	17	31	31
Total.....	155	258	300

From the above it appears that, taking 1885 as a criterion, the Warrior gives more days for towing, even in its present condition, than the Ohio, and that with the contemplated improvements perfected the towing season will equal that of the Erie Canal.

There is a decided improvement in the general commerce of France for the month of May, particularly in the exports of manufactured goods, which amounted to 140,000,000 francs, against 104,500,000 in May, 1885. The imports gain 89,500,000, and the exports increased 58,000,000. For five months of the year, however, the comparison is not so favorable. The total imports, five months of 1885, amounted to 1,763,468,000; five months of 1886, to 1,737,450,000. Exports five months of 1885, 1,258,478,000; five months of 1886, 1,206,952,000.

The Western Nail Association has appointed a committee to revise the nail card or extras list.

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All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for surface finish and exactness of gauge.

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For Shafting, Spindles, Rollers, &c., &c.

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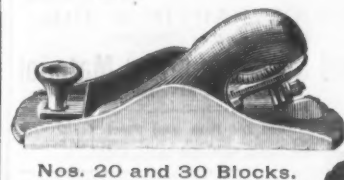


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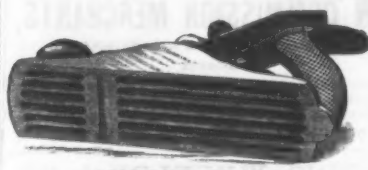
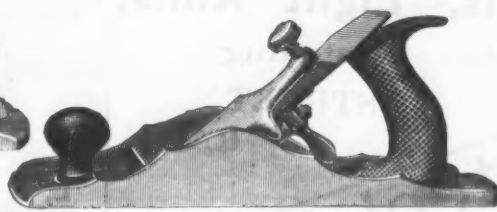
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No. 204, Iron Smooth Plane, 9x1 1/2 in. Cutter.....

No. 205, Iron Smooth Plane, 10x1 1/2 in. Cutter.....

No. 206, Iron Jack Plane, 12x2 1/2 in. Cutter.....

No. 207, Iron Jack Plane, 13x2 1/2 in. Cutter.....

No. 208, Iron Fore Plane, 18x2 1/2 in. Cutter.....

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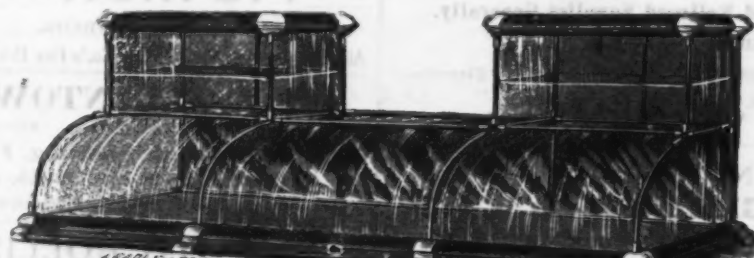
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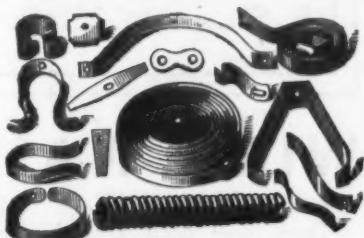
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Fig. 120.



Fig. 365.

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Patent Rubber Buckets,
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FIG. 114 REPRESENTS OUR

Hand Force Pump.It is made of brass, is strong and light, and is the best pump of its kind in the
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of Carriage and Wagon Castings constantly on hand for the trade.**C. F. RICHARDSON ATHOL, MASS., Manufacturer of
IRON LEVELS.****Magazine Rifles for Troops.**

A recent cable dispatch that the French Government has ordered 60,000 repeating rifles to be distributed among its troops by the end of this month has an interest for this country as well as for all European nations. It was shrewdly said not long ago that after the end of the next great war every Government would want magazine guns; but it now looks as if very few Governments will be willing to wait for the next war. The present act of France is spoken of as a reply to Germany's recent arming of her Alsace-Lorraine regiments with repeating arms; but both countries have long been experimenting for this purpose, and indeed it is obvious that if France had not already begun to provide herself with such weapons an order to distribute 60,000 of them in so short a time would be preposterous. As a fact, the armory at St. Etienne altered its tool plant some time ago with a view to making magazine rifles on a large scale. There have been many efforts to change the Gras into a magazine arm, the Robin system of conversion being one, while among other plans experimented with have been the Paries and Sturla, which utilize to some extent parts of the Gras action.

Magazine arms in the United States have not thus far achieved complete success in the tests to which they have been submitted by the Government, although their ultimate superiority can hardly be doubted. Not long ago issues of two leading magazine rifles were made to a certain number of organizations throughout the army, in many regiments and departments, and trials of them were made in competition with the Springfield single loader. The commanding officer of each detachment making these trials drew up a report of the results, with his comments thereon. It was found that in a large majority of the reports the existing single breech-loader was preferred. Nevertheless, the principal faults noted in the magazine arms were such as can be remedied by mechanical improvements or by a careful training of the men in their use. The brief report of General Benét on the trials, rendered a few months ago, declared that he believed that a magazine gun would eventually be adopted, but that the time had not yet come for it.

Meanwhile in Europe the movement in favor of the new system has been going on, and has already practically been pushed to success. We find the troops of Sweden armed with the Jarman, a magazine rifle of unusually long range. Austria is preparing to substitute for her somewhat inferior Werndl rifle the Mannlicher, which has a removable magazine and avoids the faults of weakness, complexity and costliness sometimes found in such weapons. Russia has been kept back by the great cost of converting into repeaters the multitude of the arms with which her arsenals are loaded. Switzerland is supplied with Vetterliu repeaters, as the little State needs to make the most of her forces. Germany has converted Mauser single-loaders into a magazine arm on a system which attracts the criticism of the experts upon several grounds, and no doubt justly, but which, after all, has the great advantages of being cheap, of using the rifles already in the hands of the troops, and of being manipulated in a manner already familiar to them, so that there is little or nothing to learn. France has armed her navy for some years with the Kropatchek repeaters, but has been looking for a modification of the Gras for her land troops. Possibly it is the Kropatchek that is to be issued in such haste to 60,000 troops of the line; but it is reasonable to suppose that some one of the many proposed modifications of the Gras has been chosen, and the required changes made. England several months ago ordered the issue of magazine guns for experiment, and now will be spurred on by the decision of Germany. In short, the lesson of the Austro-Prussian war of 1866 is not forgotten. Then the needle-gun, in the hands of disciplined troops, carried all before it. Now all nations have abandoned muzzle-loading small arms for breech-loaders, and the next step is repeating or magazine arms. No doubt we shall see a general rush to follow the lead of Germany, although the previous action of Sweden and Switzerland had been little heeded, since no nation will be willing to become a victim to a more efficient weapon in the hands of its enemy.

A Boston View of the Nail Trade.

Reflecting as it does, apparently, the views of a well-informed person in the New England nail trade, the following article from the Boston Herald will be read with interest. We have corrected several errors evidently growing out of the lack of familiarity of the writer with the industry, errors in transmission rather than in the original statement:

"The nail trade is in a very peculiar position just now. In the first place, nearly two thirds of the New England nail industry is idle, and manufacturers are questioning as to whether it be best to put in a stock of coal and iron, and continue to make nails on which they are to be beaten out of all profits by the Western manufacturer. It is a fact well understood by the New England nail manufacturers that the Knights of Labor have complete control of the nail industry; that they hold a membership of over two-thirds of the employees in the industry. It is also understood that the Amalgamated Iron and Steel Association, a society under the control of the Knights of Labor (this is an erroneous statement—Editor Iron Age) has lately found it necessary to appoint a vice-president east of the Rocky Mountains, with a special view to equalizing the pay of the operatives in the iron industry, and the pay of the New England workman in the nail mills is specially made a feature of grievance. Hence the nail manufacturer feels that trouble is likely to come at any time, and more especially when he has allowed himself to put in a stock of iron and coal, which this organized labor can see as well as the manufacturer himself. Under the circumstances the manufacturer hesitates about stocking up. But the above is not all. Ordinarily the New England manufacturer would

not hesitate. He would have a stock of saleable goods on his hands. But the conditions of the nail trade have greatly changed within a year or two. In the first place the day of the iron nail is done and the steel nail has taken its place. Beyond the Allegheny Mountains there is scarcely a machine making iron nails to-day. There is no market for the iron nail in that part of the country, and such is coming to be the case very rapidly in the East. Three great Bessemer-steel plants are being erected east of the Rockies for the purpose of making nails—one at Philadelphia, one at Harrisburg and the third at Pottsville. Not only is the steel nail better to the extent that it has taken the trade away from the iron nail, but the steel nail, when once the Bessemer plant is started, can be made very much cheaper than the iron one. Starting with the pig iron in both cases, it would require to convert this pig iron into steel, first, a Bessemer plant, a very costly institution, so to speak. Then to turn 10 tons of iron into steel it would require about 200 pounds of coke burned with a strong blast, which might be driven with any good New England water-power. When the mass is melted a strong blast of air is driven through it for a few minutes, when it is entirely deprived of its carbon, and is ready to become Bessemer steel by simply passing in a shovel of spiegel as the molten mass is drawn into molds to cool into ingots. These ingots once formed, the metal is ready to be rolled into nail plates. But to convert 10 tons of pig iron into ingots of iron, or, in other words, to get it ready for the rollers, or puddle it, what does it require? It requires 4 or 5 tons of coal and the labor of three or four puddlers a day and a half. This item of labor alone is worth from \$18 to \$20, and to it must be added the cost of coal, as against the cost of 200 pounds coke mentioned in the Bessemer process. Besides, in the Bessemer process the labor is nearly all done by machinery. It is easy to see how the steel nail is driving out the iron one in the cost of the raw material, or the steel as iron before it is ready for the rollers. But the New England nail manufacturer does not own a Bessemer plant, nor any part of one. It is understood that a single steel plant would answer the purpose of several nail concerns, since over 20 charges of 10 tons each can be converted in a day of 24 hours. It is a serious question with the majority of nail manufacturers in New England to-day as to whether to put in a Bessemer plant or go out of the business. Go out they must if the attempt is made to compete with steel nails and with manufacturers who have facilities for obtaining the steel at the cost of the raw material and converting. Were the conditions of labor favorable the question would at once be answered in favor of the Bessemer plant. But the Knights of Labor are believed to be only watching a favorable opportunity to make the attempt to put the New England nail-mill employee on the same scale of wages with the Pittsburgh workman at the same business. This is a condition which the New England manufacturer finds can never exist. There are all the advantages of iron at a minimum price and at little cost of freight, and formerly of cheap coal, but latterly the wonderful developments of natural gas in the favor of the Pittsburgh manufacturer, whereby the cost of fuel or heat is reduced to cents where dollars were formerly counted and must at present be counted against the New England manufacturer. About the only feature which counts in the favor of the New England manufacturer is a near market to sell in where nails can be landed at a low cost of freight, which cost of freight would be against the Pittsburgh manufacturer. Possibly cheap and good water-power may also be counted in the New England manufacturers' favor. Under such conditions the New England nail-making industry seems to tremble in a balance, and a balance which the Knights of Labor seem to have the power to turn the wrong way."

It is, of course, an exaggeration to state that there is scarcely a machine making iron nails in the West, that there is no market for the iron nail in that section of the country, and that such is coming to be the case rapidly in the East. We do not know of any new steel plant in contemplation at Philadelphia, and the statement that it takes 200 pounds of coke to turn 10 tons of iron into steel is understating the facts, since it takes more than that to melt the iron alone. Nor are the New England manufacturers so helpless so far as a supply of steel is concerned. The plant of the Worcester Steel Company, only partly employed in making nails, is quite accessible to many of them, and foreign steel slabs are selling at sufficiently low prices in tide-water markets, at, say, \$28 to \$30. We believe that one of the causes which make New England mills conservative is that their product has always had a high reputation for quality.

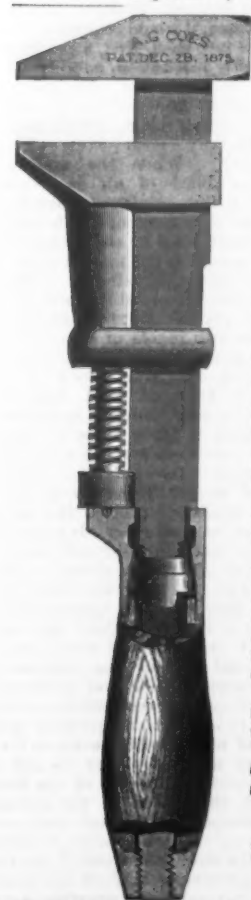
The Southern Exposition to be held at Louisville, Ky., will be opened August 28 and closed October 23. Music Hall has been altered, and is now one of the finest of its size in the country, having a seating capacity of about 7000. The art gallery will be part of the main building this year. Eight hundred and fifty horse-power will be required to run the dynamos for lighting the buildings and grounds. Four batteries comprising 16 boilers, 42 inches by 24 feet, will furnish the steam, and the Buckeye Engine Company, of Salem, Ohio, will furnish the motive-power to run the miles of shafting. The machinery department in the past seasons has been remarkably successful. At the end of one season, out of 650 cars of machinery received only 100 returned, the other 550 cars having been sold and shipped to other parts. There is no charge for space at the exposition, and only \$5 entrance fee for competition for each contributor, and not each article. Nearly all of the floor space is already taken. Foreign exhibits will occupy considerable room, and among other attractions will be the largest collection of curiosities pertaining to the natural history of America ever brought together.

California canned fruits will be laid down this season in New York at a trifle below the cost of last season.

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Manufacturers of Coes'
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THE **WRENCH** shown in the accompanying cut is one that we have recently perfected, and it has given such universal satisfaction that we wish to call particular attention to its construction.

1st. The **main bar** is re-enforced by adding metal to the back, which prevents it from bending or springing when severely used. A wrench made with this **Bar is stronger than any other make of a corresponding size**, because the **Bar** is larger near the stationary jaw, where the **strain is concentrated**. This is the only **successful re-enforced wrench bar ever made**, all others having failed when subjected to severe strain.

2d. The **Ferrule** is held firmly in place by a **nut screwed on the bar** which prevents it from being forced back into the handle by use.

3d. The **Special Improvement** to which attention is called, is the way in which the **Handle** is made and fastened to the shank.

This handle is made **Better and Stronger** than heretofore by using our new **cup tip** at the end, which encloses the wood and **keeps it from splitting**. This is the only wrench which has the **wood handle firmly secured and held together at each end**, and this handle will stand more rough usage, and last longer, than any now made. **It is not affected by heat, cold or moisture.**

All goods bearing our name and trade-mark are carefully made from the best stock, and every **wrench is fully warranted.**

Be particular in ordering from dealers to specify "**A. G. COES' GENUINE WRENCHES**," as there are other "**Coes' Wrenches**" which are sometimes sold as our make.

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This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bales, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

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We are informed that various parties are infringing upon the widely known Letters Patent granted originally to George F. Weymouth for an improved Hay Knife.

The characteristic feature of the invention is a curved blade, provided with saw-tooth cutters, and furnished with suitable working handles. It is our purpose to prosecute all infringers, and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits have been already ordered.

All manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives which are not of our genuine manufacture.

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EAST WILTON, May 10, 1886.

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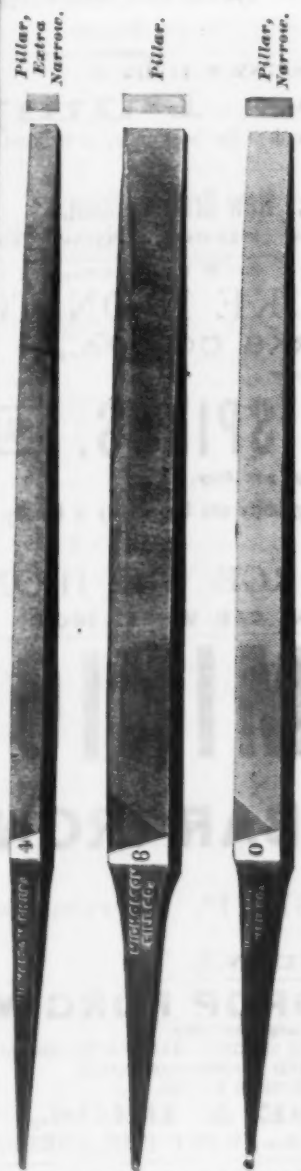
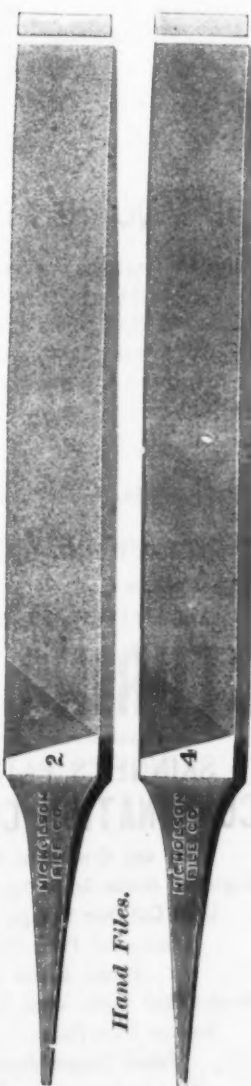
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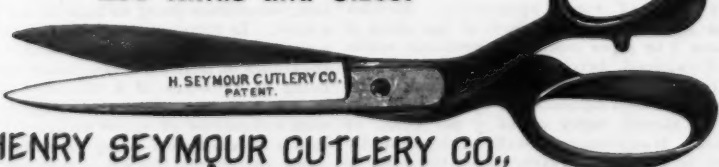
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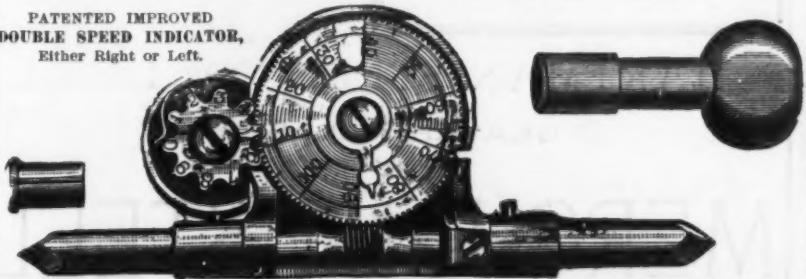
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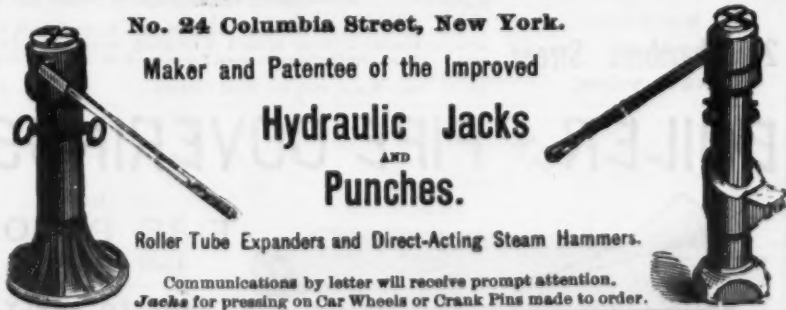
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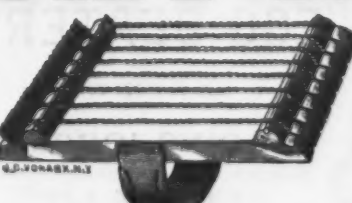
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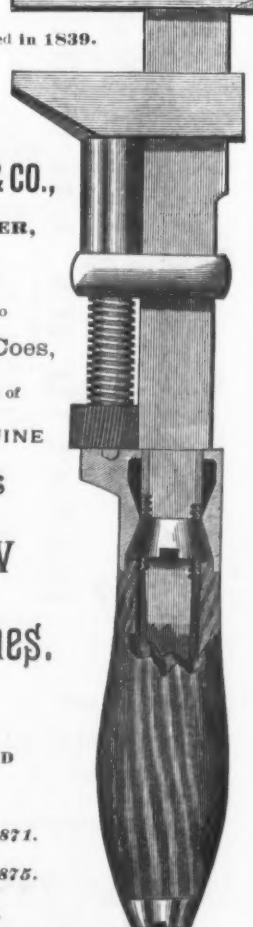
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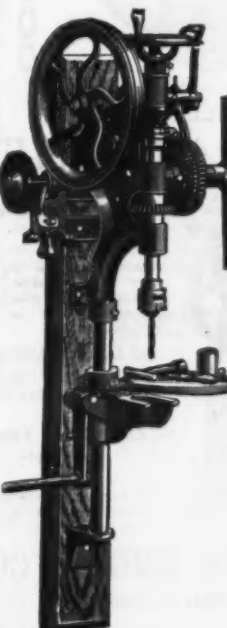
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The back strain when the Wrench is used is borne
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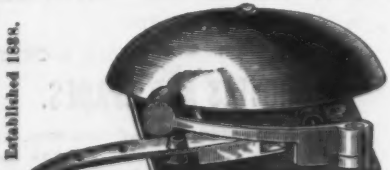
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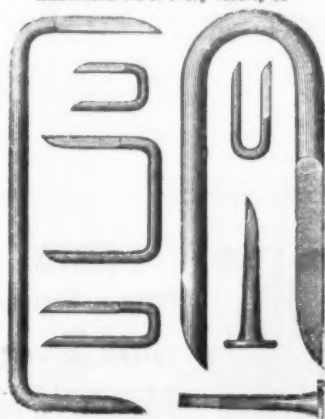
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In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

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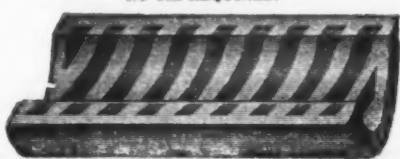
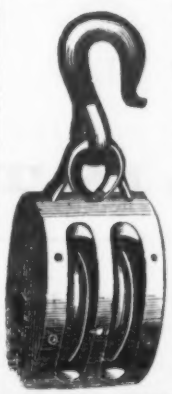
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These goods can be obtained of the general hardware trade and of our

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"STANDARD" SPRING PADLOCKS,

OF CAST BRONZE AND BRASS THROUGHOUT.



No. 8053.

With Chain.

EIGHT SIZES.

813	- - -	1 Inch.
823	- - -	1 1/4 "
833	- - -	1 1/2 "
843	- - -	1 3/4 "
853	- - -	2 "
863	- - -	2 1/4 "
873	- - -	2 1/2 "
893	- - -	3 "



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Full Size of Key.

When desired (as for railroad and other similar uses), they can be made so that the key cannot be withdrawn until the shackle is closed and locked. Made also with chain. Prices and catalogues on application.

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SCIENTIFIC AND TECHNICAL.

Fire from Heated Asbestos.

Fire originating from heated asbestos intended as sheathing is noticed by a patrol inspector in Philadelphia. In one of two recent instances the combustion chamber of a regenerative gas lamp was too near certain woodwork, and asbestos was inserted between, but the heat soon penetrated the stratum of asbestos and set fire to the wood. In the other case the sheet iron top of a portable heater was within a few inches of the joists of first floor; asbestos was placed on the heater, but heat passed through and the joists took fire. Heat was always above 300° F. and confined. No fires were noted from steam pipes sheathed in asbestos. The inspector recommends as a safeguard from the heating of the non-inflammable fibrous stone an unobstructed air current between the source of the heat and the asbestos covering.

Hydrogen in Glow Lamps.

The well-known fact that the carbon filament of a vacuum glow lamp is gradually dissipated by some electric or thermal effect of the vacuum points to the trial of lamps in which the vacuum is discarded and its place supplied by an atmosphere of hydrogen, nitrogen or other gas which cannot oxidize or burn the filament. According to Engineering, Messrs. Siemens Brothers have lately been making lamps filled with hydrogen, and they find that these lamps do not become sooty on the inner surface of the glass. Next to a filament which will remain incandescent in the open air, an envelope which will remain clean and not of itself destroy the filament is a desideratum.

A New Alloy of Aluminium.

The applications of aluminium are now considerable, and M. Bourbouze, a French physicist, has added to their number by employing an alloy of the metal with tin for the internal parts of optical instruments, in place of brass. The alloy he employs consists of 10 parts of tin and 100 parts of aluminium. It is white, like aluminium, and has a density of 2.85, which is a little higher than that of pure aluminium. It is therefore comparatively light, which is an advantage for apparatus where lightness is desired. It can be soldered as easily as brass, without special means, and it is even more unalterable than aluminium to reagents. The attention of electrical instrument makers should therefore be called to it, especially for apparatus of a portable character.

A Lump of Coal.

Few persons have any idea of the wonderful products from a lump of coal—a lump of coal that is placed in the retort of a gas manufactory. Ordinarily burned, the combustion of a lump of coal results in carbonic acid, smoke, which is simply soot, or rather the visible portion of smoke is soot, and the ash, in which are found silica, alumina, oxide of iron, phosphoric acid, sulphuric acid, potash, sodium, combined sulphur and sometimes traces of chlorine, titanate acid and other substances. In the gas retort a variety of products are obtained. The gas as it is carried through the hydraulic main to the purifying-rooms takes with it tar and ammonia, the latter evolved from the nitrogen. The ammonia has to be washed out with water, in an arrangement by which the ammonia is gathered and saved. Tons and tons of sulphate of ammonia are thus made and become an article of commerce. The sulphur is removed by caustic lime or oxide of iron. The carbonic acid is also removed by lime, but the carbonic oxide cannot be removed, and with several others remain in the gas after all efforts to remove it. These others give the gas its smell. By distillation naphtha and asphaltum are obtained. Asphaltum is a dead oil, very useful to preserve wood. From this, too, carbolic acid is obtained, very important in surgical operations as being the most valuable antiseptic known. From naphtha, benzole, cumol, teluol and cymol are obtained. Naphtha, as is well known, is used as a burning fluid. Benzole is a solvent for grease and oils, very useful in cleaning kid gloves and things of that kind. Benzole treated with nitric acid produces nitro-benzole. This, singularly enough, is used as a flavoring extract by confectioners and for perfuming soap. When used for this purpose it is known in commerce as the essence of myrrhane, which it is not, although it smells and tastes something like essence of myrrhane or oil of bitter almonds. Nitro-benzole is terribly poisonous, but not more so than some other adulterants used by confectioners. From nitro-benzole aniline is obtained. This, when first obtained, is a perfectly colorless liquid, but darkens as it grows older. From aniline are obtained the coal-tar colors, which are so very brilliant. The different colors known to the trade as aniline colors are of all hues. The one known as "turkey red" is exactly similar to the red that used to be made from the madder root. Since the discovery of this aniline it has almost completely broken up the raising of madder in Holland. There thousands of acres were devoted to the raising of madder root to get the turkey-red dye. It can be made much cheaper from the product of a gas factory. There are still many other products of a lump of coal after it is placed in the gas retort which cannot be enumerated here.

An Impalpable Counter.

An ingenious method of indicating the oscillations of a free pendulum, and which, indeed, is applicable to other delicate movements which require to be unhampered by extraneous forces, has been devised by M. Marcel Deprez, the well-known French electrician. M. d'Abbadie, of the French Academy of Sciences, proposed to utilize a ray of light incident at each oscillation on a selenium cell in circuit with a battery and an electro-magnetic counter. M. Deprez has, however, chosen a thermo-electric in place of this photophonic arrangement. The pendulum is furnished with a screen provided with a window 30 mm. to 40 mm. long, and 3 mm. to 4 mm. wide. A pencil of luminous rays from a petroleum lamp with a flat wick, and concentrated by means of a cylindrical lens traversing the aperture or window at each oscil-

lation, is caused to strike upon a thermo-electric pile having all its like junctions echeloned on a length equal to that of the window. At each oscillation an electric current is thus sent through the galvanometer, which is very sensitive and aperiodic. This galvanometer works a relay which closes the circuit of an electric counter.

Explosive Ice.

The explosive quartz of Branchville, Conn., which owes this peculiar property to minute crevices in its mass being filled with partly liquefied carbon-dioxide, has been matched by a specimen of ice formed during very cold weather last January in the laboratory of the University of Virginia. Mr. Mallet, of that institution, describes how the phenomenon took place. The ice was formed in the vessel of a "gasogene" or apparatus for charging distilled water with carbonic acid gas, and it burst the vessel, which was made of thick glass. The ice itself exploded repeatedly and threw off fragments with a crackling sound. Mr. Mallet attributes the effect to the force of the gas contained under pressure in crevices of the ice.

Reactions Under the Influence of Pressure.

When a mixture of carbonate of sodium and sulphate of barium is melted there is a complete reaction when the sodium carbonate is employed in sufficient quantities. After cooling the soluble salts can be removed by the aid of water, and the insoluble residue is formed exclusively of carbonate of barium. W. Spring has found a similar reaction, though less complete, from the influence of pressure alone, which is a fact of some consequence in the study of the molecular actions which take place between solid bodies in contact. He has experimented under pressures of about 6000 atmospheres, continuing for intervals varying between a few seconds and 24 days, and also upon the combined influences of pressure and temperature. In the latter case he has found, as might have been anticipated, that heat exercises an influence opposed to that of compression. These experiments have an obvious bearing upon the diffusibility of matter in a solid state, as well as upon the explanation of some other natural phenomena which are not yet well understood.

The Nation's Great Problem.

Prof. R. H. Thurston, director of Sibley College, Cornell University, in his recent lecture before the graduating class of the Rose Polytechnic Institute, at Terre Haute, Ind., took for his subject the nation's great problem, the possibility of progress without revolution. The solution of this problem he finds in education—the careful, moral cultivation of the people at large. There are, it is said, two distinct systems of education—the old, or gymnastic, and the new, or technical; but a deeper interpretation of the intellectual life shows no such distinction. However better adapted the new education may be to our present wants, it has at its foundation the elements of the old. The technical education, which is now beginning to receive proper recognition in our systems of culture, is simply the supplement to our older, incomplete academic training. In the ideal education the citizen is fitted for the successful pursuit of every desirable object in life.

The education at school and college is no longer regarded as a finality, but simply as a means to an end, and that end is the student's life work and culture. Some years ago, in tracing the history of the development of the modern steam engine, Professor Thurston divided its growth into three periods—speculation, application in several distinct forms, and finally a period of refinement. In the growth of our educational systems we have reached this third stage, the period of refinement, in which the elements of the complete system being present, it remains for us to select and arrange them to form a symmetrical whole of maximum efficiency, and adapted as perfectly as possible to the purposes which the experience and wisdom of the world have found essential. But the subject of technical education is so large that it has become necessary to specialize, and we have, accordingly, the manual training school, the trade school and the school of engineering, in which the use of tools, their application in the arts, and finally the principles of design, are respectively taught. By training each citizen to the greatest efficiency in his chosen work it becomes possible to make our progress not only rapid, but, what is of infinitely more importance, continuous.

Electrical Alarm for a Cable Road.

In view of the liability of accidents in the running of cable cars the Philadelphia Traction Company are introducing a new electrical system on their Market street branch. The plan consists in laying leaden tubes containing telegraph wires alongside the conduits; a simple alarm box will be placed in each manhole along the route of the cable cars. This affords instant communication with the engine-house at Twentieth street, and when an accident occurs to the cable necessitating the stoppage of the engine an alarm can be sent at once to the station, and through an arrangement of signals any information that is needed to meet the emergency can be instantly forwarded.

There is some excitement in the Birmingham district, England, over complaints from New Zealand on the quality of English carriage nuts and bolts, the purchasers asserting that the American goods are much better.

The business colleges of the United States have within 20 years multiplied from a few institutions to several hundred, some of which have an annual registration of over 1000 students each. United States Commissioner Eaton reports a greater number of graduates from the business colleges than from the colleges of law, medicine and theology combined. Official reports show about 50,000 students during the past year.

H. D. SMITH & CO.,

Plantville, Conn.,

MANUFACTURERS OF THE

BEST QUALITY CARRIAGE MAKERS' HARDWARE,

Manufacture the Largest Variety of Forged Carriage Irons, of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED

SEND FOR PRICE LIST.

BURGESS STEEL AND IRON WORKS,

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MANUFACTURERS OF CRUCIBLE AND OPEN-HEARTH STEEL, AND U. S. NORWAY IRON.

COMPRESSED IRON AND STEEL SHAFTING. IRON AND STEEL BOILER PLATE.

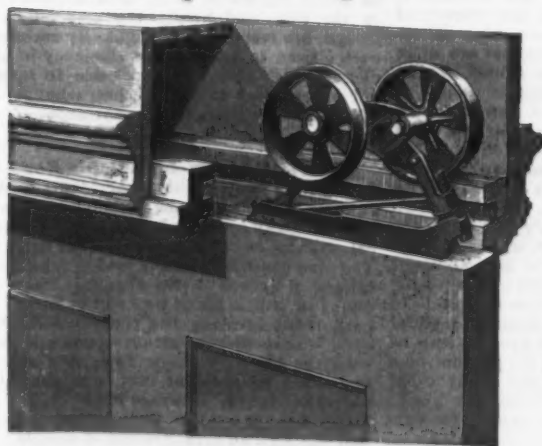
5-Ply Safe and Jail Steel. Iron and Soft Steel Center Plow Steel.

Spring, Tool and Tire Steel, and Steel for Agricultural Purposes, Cut to Patterns Sent Us.

A. FIELD & SONS, MANUFACTURERS OF WIRE NAILS

of Every Quality and Description.
Taunton, Mass., & 78 Chambers
Street, New York,

Barry's Patent Parlor Door Hanger.



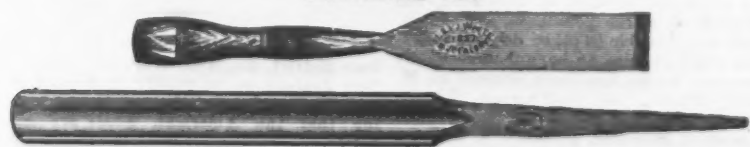
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will not bind on an
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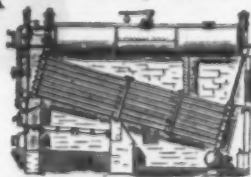
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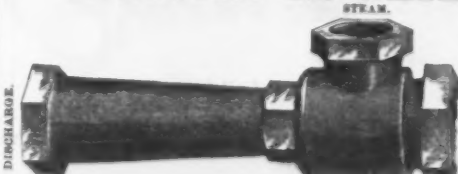


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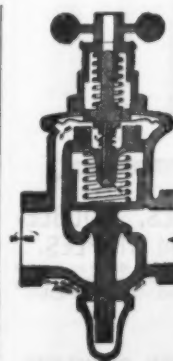
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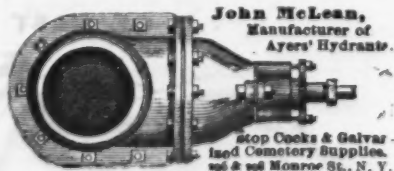


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The Freight-Train Brake Tests.

An important test of competitive freight-train brakes commenced at or near Burlington, Iowa, on July 13. A long list of experiments are to be made under the direction of the Master Car-Builders' Association, the first series of which are to be conducted on a track at 8 miles in length, belonging to the Chicago, Burlington and Quincy system, and extending from Middletown through West Burlington to Burlington. Each of the competing brake companies was required to equip with their brake 50 30-foot or 34-foot box cars, of 40,000 pounds capacity, each car to be equipped with brakes on both trucks and plain cast-iron shoes. There are five competitors, and as the brakes are applied to new rolling stock all the companies are presumably subjected to some disadvantages arising from this circumstance at the outset. On account of special imperfections discovered on parts of the cars to which the Rote brakes were attached that company requested and received permission to have an additional period of 30 days to remedy these defects. The American Brake Company had rolling stock which they were preparing destroyed by fire a short time before the tests commenced, and they received permission to extend for a short time the period for producing their fully-equipped train, but they expected to have all arrangements completed after a very brief delay.

The ownership of the cars present at the commencement of the tests was as follows: The Westinghouse brake was applied to Chicago, Burlington and Quincy cars; the Eames brake to Indianapolis, Decatur and Springfield cars; the Rote brake to Chicago, Rock Island and Pacific cars, and the Wildfield & Button brake to Lehigh Valley cars. All these cars are to be returned to the companies who own them, and to be subjected to a protracted endurance test in general service on their respective lines, after the preliminary tests are completed, and after the endurance test, which is to be as continuous and as fully recorded as possible, the cars are to be returned to Burlington for a second series of special tests under the direction of the master car-builders' committee in April, 1887. The preliminary tests commenced two weeks ago can scarcely be regarded as conclusive in any respect, as they are only a starting point in what promises to be a very extensive experimental investigation, as all the companies are laboring at the outset under disadvantages of one kind or another. The rules required that in the preliminary tests two ordinary eight-wheel engines should be employed, one of which was to be equipped with the Westinghouse driver brake and the other with the Eames vacuum brake. A third engine was furnished with the American driver brake. The first test, on July 13, related to the operations of these engines. It was followed by a test of the effect of hand-applied brakes. Subsequently there were tests of some of the freight-train brakes applied to 25 cars, some of which were loaded and some empty. The list of tests to be applied at Burlington in the experiments already commenced and now progressing include the following:

- GENERAL TESTS.**
1. Fifty-car trains on down grade 54 to 56 feet per mile, running forward, quick stops.
 - a. All cars loaded, 30 and 20 miles per hour.
 - b. All cars empty, 40 and 20 miles per hour.
 - c. Cars mixed (see below), 40 and 20 miles per hour.
- Note.—Half the cars to be loaded and half empty, 75 per cent. of the latter to be on the front half of train. During these tests the rapidity with which the train gets away after a stop will be noted, the time being taken from stop to start.
2. Fifty-car trains on level, running forward, quick stops.
 - Same as tests on grade, except that trials are on level.
 3. A train of 50 loaded cars to be let down a grade of 54 to 56 feet per mile 3 miles long. Speed of 30 miles per hour at top of grade to be reduced to 15 miles per hour and maintained without material variation all down the grade.
 4. Twenty-five-car trains. Twelve cars to be loaded and 13 empty, about 75 per cent. of empties being on the front half of train. Tests to be made on a down grade of 54 to 56 feet per mile, running forward at speeds of 40 and 20 miles per hour.
 5. Similar trains to above. Tests to be made on level at 40 and 20 miles per hour.
 6. Similar trains to above. Tests to be made ascending grade of 54 to 56 feet per mile, engine in front of train pulling. Speed about 12 miles per hour.

- SPECIAL TESTS.**
1. Twenty-five-car trains. Half the cars to be loaded and half empty, about 75 per cent. of the empties cars being on the front half of the train. Tests on the level. Trains to be broken in two near the center. Speeds 40 and 20 miles per hour. After the train is broken in two any assistance necessary will be rendered only by a brakeman, who shall be riding at the rear of the train when the breakaway occurs. (See Rule No. 4.)
 - Note.—In all the above tests all the cars in a train are fitted with the same automatic brake.
 2. Similar trains as above as regards number and loads of cars. One-half of the cars to be equipped with the same automatic brake, and the other half with hand brakes only. Three cars with hand brakes only next tender, then three with train brake, and so on. Tests on the level. Speeds 30 and 20 miles per hour.
 3. Twenty-five-car mixed trains with the same train brake on 12 cars next tender. The rear 13 cars to have hand brakes only. Speeds 40 and 20 miles per hour. Tests to be on level.
 4. Fifty-car trains. Trains to be composed in equal proportions of different train brakes that will operate together. Half of the cars empty and half loaded—about 75 per cent. of the empty cars in front of train.

Note.—No hand brakes to be used on tests 2, 3 and 4.

In illustration of the diffusion of gases, Mr. W. Anderson, the well-known English investigator, recently gave some good exam-

ples through porous media of inconceivable fineness. When two gases, such as hydrogen and air, are separated by a porous medium they immediately begin to pass into each other, and the lighter gas passes through more quickly than the heavier. He showed a glass tube, the upper end of which was closed by a thin slice of cork, the lower end dipped into a basin of water. The tube was filled with hydrogen, which is about 14 1/2 times lighter than air; consequently it left the tube through the cork more quickly than the air could enter in by the same means, and the result was a partial vacuum in the tube, and a column of water drawn up, proving that the cells of cork are eminently pervious to gases. The pores in the cell walls appear, however, to be too minute to permit the passage of liquids.

Foreign Markets.

FRANCE.
PARIS, July 15, 1886.—Metals.—Midsummer is usually a dull time, and this year there seems to be no exception to the rule. Metals during the week have been flat. Copper being steady. Tin higher and Lead and Spelter easier. We quote at the close in francs per 100 kg.: Copper—Chili Bars, 102.50 @ 105; Ingots and Slabs, 107.50; Best Selected, 110.50, and Pure Corroco Ore, 103.50. Tin—Banca, 270.25; Billiton, 275; Straits, 270; Australian, 272.25, and English, 267.50. Lead, 35 @ 35.50, and Spelter, 36.50 @ 37. Iron.—All iron markets in France, ours included, have remained firm during the week, though perhaps less active on the whole. Here flooring iron sold as high as 14 @ 16 francs per 100 kg. An encouraging sign has been the receipt of orders for railroad material from Portugal, where they prefer French material to Belgian, although slightly dearer. The general outlook remains encouraging; in the first place there are the large amounts to be spent on public works, and in the second place there is the harmonious action of makers in the North of France, with every probability that the good management which has so far characterized such action will prevent the French iron trade from falling back into an unsound position. Coal—Has remained quiet and steady.—*Moniteur des Interets Matériels.*

BELGIUM.
BRUSSELS, July 15, 1886.—Iron.—A quieter feeling has begun to prevail in the Belgian iron market; orders, it is true, continue dropping in steadily and sufficient in amount to keep nearly all our rolling mills busy, but by common agreement no maker thinks of raising prices. The fact is that, low as they are, present prices leave the maker still a margin of profit; hence it would be folly to run the risk of spoiling a situation which, if not brilliant, is good enough to bridge over the summer months. This so far as finished iron is concerned; as for pig, it is abundant and cheap, without prospects of a speedy improvement. Should the demand for Forge Pig suddenly increase, Luxembourg could double its output at short notice, and Charleroi is similarly situated. Coal is also very low; hence the rolling-mill owner has the advantage of low-priced raw material. We quote: Luxembourg Forge Pig, 3.80 francs per 100 kg.; Charleroi, 3.70 @ 4.70; Foundry, Luxembourg, 4; Charleroi, 5.75; Merchant No. 1, 10 francs; Beams, 10; Angles, 15; Sheets, 12.50 @ 20.50 francs as a range. Coal has been dull and weak; Steam Coal at 5.50 @ 6 francs per ton, and Domestic at 10 @ 12.—*Moniteur Industriel.*

GERMANY.
HAMBURG, July 15, 1886.—Iron.—Works in Rhenish Westphalia have been at rest, taking stock for the past fortnight most of them; hence little has transpired in the way of business. Pig iron has formed an exception, however, and some large lines have changed hands at a slight decline. There is also an improved export demand for Spiegel and some more inquiry for Forge Pig, but Foundry Pig and Luxembourg are too freely offered and tending downward, while Thomas is tolerably well sustained. As for rolling-mill products, some consumers neglected to secure what they required before July 1, and are now compelled to pay an advance at a time when the stock is reduced. Orders have also been accumulating for Sheets, so that the mills will be busy turning them out during what remains of the month. Wire rods are even duller than before, and production will have to be lessened. Occupation has diminished considerably at the steel works making railroad material; orders are light and they will have to manage accordingly. There is also a lack of orders for Cars, Locomotives, Boilers and Structural Iron. Meanwhile the pig-iron situation in Upper Silesia is anything but cheerful; although blast furnaces continue to be blown out occasionally, those remaining active have greater capacity than formerly, so that great stocks remain larger all the time than they should be. The outlook for rolling mills is on the other hand rather promising. Metals have been quiet, but well sustained.—*Borsenkalender.*

AUSTRIA.
VIENNA, July 11, 1886.—Iron.—There has been considerable animation during the week in iron. Hardware and Agricultural Implements, but toward the close harvesting time has caused a lull in the demand for the latter, whereas an all the better inquiry is springing up for Structural Iron and Thick Sheets. Thin Sheets being neglected. As there is in course of formation, however, a syndicate of rolling-mill owners turning out Sheets of all kinds, it is believed greater stability will be established in the prices of all of them without exception. The sugar campaign will also create a good demand for Sheet Iron. Meanwhile machine shops are the reverse of busy, and this dullness contributes to keep iron prices low. For some time past the export of Scotch and Silesia has fallen off very much, a phenomenon not yet satisfactorily explained. Something similar has happened with Enamelled Hollow-Ware from Bohemia. The price of Pig iron has been reduced still further; we quote the range 40 @ 49; Merchant, 117.50 @ 122.50; Styrian, 95 @ 96 do. Bohemian; Sheets, 140 @ 175; Beams 105 @ 110 francs per ton. Metals have been steady; Copper 9 1/2 @ 100 kg.; 54.35 @ 58.50; Tin, 135 @ 134; Lead, 18 @ 18.50, and Spelter, 18.50.—*Austrian Trade Journal.*

CHILI.
VALPARAISO, May 28, 1886.—Copper.—Has been sparingly offered, and, as at the same time cable quotations fluctuated widely and the exchange advanced, little transpired, sales being restricted to 18,100 quintals at \$18 @ \$18.80, extra brands bringing \$19.10 @ \$19.20, and 190 tons Vicuña selling at \$17.50. The latter figure equals \$29.50 in England. Nitrate.—On the 13th inst. quite a rebound set in, started by a speculative movement in Europe, 95 @ simultaneously advancing from \$3.15 to \$3.30, the sales amounting to 1,041,000 quintals, 571,000 of which were brought back, so that all June-July shipments have been disposed of. Hence little will be offering for some time to come, which may prevent a recoil should the foreign markets drop again, as there are some indications they will. The price of \$3.30 equals 87 1/2 cwt. in England. Charters amounted to 14,700 tons for Europe and 1600 tons for the United States. Coal.—Arrivals have been limited to one cargo Smelting Coal, sold at \$7.50. The visible supply is light. We quote Newcastle, West Hartley, 30; Orre, 19; Australian, Newcastle, Welland, \$7.25 @ \$7.50, and Smelting Coal, \$7.50. Exchange—Rose from 21 1/2 to 22 1/2, 90 days, as it is expected Congress, to assemble on the 1st prox. will take measures to improve the national finances.—*Weber & Co.*

HOLLAND.
ROTTERDAM, July 11, 1886.—Tin.—Has relapsed into dullness. We quote Banca, spot, 62 guilders 30 @ 63; Billiton, September, 61.50; do. October, 61.75.—*Koch & Vlierboom.*

SPAIN.
BILBAO, July 8, 1886.—Iron.—The Iron-Ore market has displayed but little activity; prices meanwhile remain unaltered. We quote Compani 6 1/4 @ 6 1/2 and Rubios 6 @ 6 1/2. Little doing in freights. The export of Ore so far sums up 1,085,587 tons, against 1,063,411 last year. A syndicate of Iron-masters at Onate has been formed to start Hardware manufacture from Spanish steel. At the same time the rolling mill of Duro & Co. in the Asturias, has engaged to roll into sheets the blooms of the Bilbao Altos Hornos Company. The Locomotive invented specially for the use of Spanish railroads by Don Pedro Ribera is declared to fully answer all purposes. A full description of it will be found in the *Boletín de Asociados Ingenieros de España*.—*Revista Minera.*

The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, July 29, 1886.

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JAMES C. BAYLES, - - - Editor.
CHAS. KIRCHHOFF, Jr., - Associate Editor.
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The office of this journal is removed to 66 and 68 Duane Street.

Eastern Manufacturers and the Anthracite Coal Companies.

The anthracite coal companies last week made one of those periodical moves which are fast losing their power as stimulants to the trade. The entire business seems to be fast drifting into a condition deplorable alike to producers, consumers and dealers. The management of the coal companies is becoming more and more notorious for chicanery and for puzzling inconsistency. There are a number of causes for this state of affairs, some of which are far from creditable to the magnates of the coal trade. There is a growing conviction that the exigencies in the manipulations of a few stocks in Wall street are given more consideration in determining the action of managers of coal companies than the necessities of the trade, be it consumers, middlemen or producers. It is intimated that the prospect of personal gains of cliques near headquarters have more to do in shaping policy than the desire to direct great interests so that shareholders receive the largest benefit consistent with a due regard for the future of the business, or for the needs of large industrial interests to some extent dependent upon fairly cheap fuel. Aside from such motives the principal aims of the companies appear to have been collectively to hoodwink the public in general and buyers in particular, and individually to steal a march on rivals. Posing before the investing public and before consumers as an ironclad combination, the coal companies have been diligently engaged for years in breaking the letter and the spirit of agreements entered into. For a long time they were supposed to be carrying out a policy of restriction of output by decreeing at times stoppages of parts of a week or of entire weeks. This plan became impracticable. It never did reduce the output to the extent that the ratio between idle and active periods would tend to indicate, merely because everything was gotten ready during times of stoppage to rush out exceptional quantities in the days immediately following them. Intent each in procuring a greater and greater share of the business, colliery after colliery was opened, thus enormously increasing the capacity at a time when even the older

shipping mines could turn out more coal than the market would carry. Price circles were issued month after month, the only object of which was apparently to gull a few into the belief that they represented the market. In some cases a show of virtue was maintained by doing the cutting through firms bound to the leading men through favoritism or kinship. At last the dangers growing out of this system became so threatening that another plan was adopted, that of allotting among the different coal-carrying roads the quantity of coal which it was supposed the market would take. This, it was decided, would be the panacea for all ills, and on the strength of it investors were invited to take hold of certain stocks, while some buyers were cajoled into covering requirements for long periods with the assurance often given that the combination would prevent a decline and if possible engineer an advance. The combination was supposed to rest upon an "understanding among gentlemen," and yet the first six months of the present year have witnessed an excess of shipment above allotment in the case of at least two companies, and quite a decline in prices. As usual, matters were allowed to drift along until nothing short of violent measures could prevent open rupture. Now the coal companies profess to have one of their sudden spells of virtue. All transgressions in the past have been pardoned, the usual assurances have been exchanged, and the advance has been decreed which is always the feature of these compacts. This time it is modestly worded in a different manner, being a restoration to figures previous to the latest cut. Then, too, a real advance is allowed to loom up, but judging by the past this will probably mean that "at a future date we expect to get the price we are now nominally asking, being in the meantime engaged in filling old contracts." The elasticity of "old contracts" has always been a special feature of the anthracite coal trade.

The happenings of the past six months have demonstrated that the allotment plan is no better than the other methods of restriction which have failed in the past. Its strongest claim to acceptance was that it made it possible to put coal on the market more cheaply by closing down those collieries which were expensive to run, and work full time those which were most favorably circumstanced. It has been defeated by the eagerness of some of the companies to carry coal to market, and by the financial pressure on some of the others. Some have crowded the market with more coal than they had a right to ship, others have depressed the market with forced sales to raise funds to keep bankrupt concerns afloat. With these two elements powerful factors in the trade, and with the intense rivalry and distrust among the managers, buyers will do best to play a waiting game. The past has shown that those have done best who have not placed any faith whatever in the professions of the so-called combination, and there are features in the present situation which warrant the belief that a continuance of this policy is the wisest so long as consumption remains as moderate as it has been thus far.

The greater part of the anthracite mined is used for domestic purposes, and that, of course, is dependent principally upon the severity of winter, the demand being massed in a few months. A smaller proposition is required for manufacturing purposes and for the iron trade. It must compete then with bituminous coals directly, a fact which to some extent is a safeguard to the manufacturers of New England, New York, New Jersey and Eastern Pennsylvania. But it must not be forgotten that anthracite must also compete indirectly with the cheap fuels of many other sections of the country, or, in other words, if the coal companies do not keep their prices low their customers will lose trade. In iron manufacture the anthracite blast furnaces are threatened by the cheaper irons of their Southern rivals, while the rolling mills may be forced to contend with the cheap natural gas of Western Pennsylvania. Cheap fuel has therefore more than ever become an absolute necessity to the manufacturing industries of the East as against domestic and foreign rivals, and it is the duty of those in charge of these enterprises to give close attention to the coal question. The majority have probably long since accepted the views we have put forward and have acted upon them. But we have reason to believe that there are some who still cling to the traditions which the coal companies are trying so hard to keep alive by a show of concerted action. Unless momentous changes take place, the near future will be merely a repetition of the past.

A short time since we saw in a German technical paper an account of some experiments which had been made with steam jets for extinguishing fires. As we remember the results and conclusions arrived at, it seems that steam for this purpose has in Germany been of limited application, and the outcome of the trials, we need therefore remark, utterly failed to satisfy expectations. Experimental wooden structures were erected and fired on the inside, and steam was admitted after the fires had attained different degrees of headway. The structures also, we believe, were made reasonably tight, so as to prevent excessive blowing through of the steam, but in every instance it was found the fire was held in check only and not extinguished, and burst

forth with renewed vigor when the supply of steam was cut off. Unfortunately these results, which to a certain extent are inconclusive, may be accepted in some quarters as true measures of the value of steam jets for fire extinguishing, and it is therefore well to point out that further trials under various conditions of many kinds would undoubtedly have presented the method in a more favorable light. As a matter of fact, live steam has been found one of the best agents we possess for extinguishing fires in small inclosed compartments, and its merits in this direction have been generally recognized in this country. The size of the room operated upon, however, is an important factor in the question, and it is in this respect that the German experimenters may, and very probably have, overrated the efficiency of the steam jet. Nevertheless, it already has an established reputation for reliable work, and will no doubt retain the good opinion of mill owners and others specially interested in fire protection.

The Silver Folly.

In spite of the protests of Secretary Manning that the discretion of the head of the Treasury Department to regulate the surplus should not be abridged or interfered with, the House of Representatives has adopted a resolution requiring the Secretary of the Treasury, whenever the surplus or balance in the Treasury, including the amount held for redemption of United States notes, shall exceed \$100,000,000, to apply the excess, in sums of not less than \$10,000,000 per month, to the payment of the interest-bearing indebtedness of the United States, payable at the option of the Government. The proposition was under discussion for two days or for parts of two sessions. Mr. Morrison, who introduced the resolution, explained his position by stating that he found that \$25,664,054, or more than one-third of the money in the country, was in the Treasury. Of this \$182,000,000 was there for redemption purposes. He found more than \$200,000,000 held for current uses, including the amount held for the redemption of legal-tender notes. His purpose in pressing the resolution was to reduce the surplus by monthly calls and payments as often as there is more than \$10,000,000 in the Treasury above all the balances and all the liabilities, and also the unavailable fractional silver coin. This he argued would "make money cheaper, increase the means of exchange, and help in the transaction of business." It would save \$3,000,000 of annual interest and annual taxes, and do away with the temptation in Congress to vote large appropriations because there is "too much money in the Treasury."

Mr. Hewitt, in opposition to the resolution denied that the money to be released from the Treasury would go immediately into the channels of trade. On the contrary, it would be paid to the bondholder, who would simply pocket the proceeds in a market already abounding with capital. In conclusion he summed up his objections to the resolution: Four months after its passage the country would be brought back to the condition in which it had been on the 4th of March, 1885, and gold would be withdrawn from circulation. The moment that occurred millions of men would lose their daily employment. Then a demand would come for greenbacks, and the long struggle for a sound currency would end in fiat money. Of course when the country had passed through the valley of death which once it had traveled with tears and lamentations, made wiser by suffering, taught by bitter experience, it would slowly retrace its steps to the basis of honest money.

As commonly interpreted, the requirements of the resolution are very simple, namely, to use the depreciated silver dollar in payment of the interest-bearing debt of the United States. This might relieve the Treasury, but would it satisfy the creditor to receive 75 cents on a dollar? The surplus of \$75,000,000 referred to by Mr. Morrison being in standard silver dollars, the tender of a depreciated dollar is evidently implied by the scope of the resolution. The country at large would doubtless like to know the real animus of the reckless measures of financial legislation ever and anon sprung upon Congress, seemingly with the deliberate intention of dissipating, if not actually wasting, the national resources. It will be found upon examination that in one way or another they unerringly point to a silver cataclysm, with its accompaniments of repudiation, national dishonor, upheaval of trade and industry—in short, a financial crisis which would be felt around the globe. Is it possible that any considerable number of men high in official position are prepared to welcome such consequences?

We would not have it understood that repudiation in any shape is a possible consequence of the proposed Treasury disbursement, only so far as this measure points to eventual exhaustion of the gold basis. Any draft on the Treasury which a bondholder may receive is good for its face so long as gold can be obtained at par on a bank check. Just before the passage of the Morrison resolution by the House, Mr. McKinley, of Ohio, sent to Acting Secretary Fairchild the following dispatch:

The Honorable C. S. Fairchild, Acting Secretary of the Treasury: If balance of \$75,000,000, as shown by Treasurer's report of June 30 last, should be used to pay bonds, what would the

Treasury have left for working balance besides fractional silver coin? An immediate answer will oblige.

The Secretary wrote in answer precisely what he believed, as follows:

TREASURY DEPARTMENT, July 14.

The Honorable William McKinley, Jr., House of Representatives: In reply to your telegram of this date asking what the Treasury would have left for working balance besides the fractional silver coin if the balance of \$75,000,000, as shown by the Treasurer's report of June 30 last, should be used in paying bonds, I beg to state that nothing would be left but trust funds, which it would be dishonorable and dishonest to use for that purpose.
C. S. FAIRCHILD, Acting Secretary.

The business interests of the country, distrustful of the Senate, are relying chiefly upon the President to veto the Morrison resolution.

The Electrical Subway.

The practicability of laying electrical wires underground having been demonstrated not only in some of the chief cities in Europe, but experimentally and otherwise at various points in the United States, the Legislature of the State of New York directed that the network of overhead wires in New York City should come down, thus relieving the streets of a serious impediment and in other respects affording a needed relief. Commissioners were appointed to execute the work, but were at once embarrassed by the numerous plans presented by inventors and would-be contractors, each claiming to control patents and methods indispensable to success and worth a great deal of money. It was not until the recent appointment of Mr. Roswell P. Flower, successor to the late Mr. Loew, that decisive action was taken with reference to rival claims. The announcement is now made that on the 22d inst. the Consolidated Electrical Subway Company delivered its contract and bond to the commission, pledging itself to the faithful performance of the task of laying underground conduits according to the specifications adopted by the commission. The indemnity bond required by the Subway Commissioners was for the sum of \$500,000, with five sureties. In perfecting the papers exchanged in this important contract, which concerns all who are in any way connected either as consumers or manufacturers in the use of the electric lights or electric wires of any description, as well as the telephone, the signatures were duly attached—Mr. Theodore Moss for the Subway Commission and Henry Fitzhugh, president, and W. L. Sefton, secretary, for the construction company. All that is guaranteed to the company is the right to build subways in the City of New York according to the plans and specifications furnished by the commission, which has the power to change the plans and specifications at any time. Every point connected with the construction of this subway is placed absolutely in the hands of the commission. By the terms of the contract the management and rental of the completed subways are placed in the hands of the company, subject at all times to revisions and reversal by the commission, but the commission must not interfere except to carry out the intent of the contract, the intent of the laws of the State or the intent of the ordinances of the city. The rentals of the subway to the various electrical companies using it must be fixed at a fair rate, and there must be no partiality. When any dispute about the rental shall arise the matter shall be finally settled by the commission. The subways are to be vested in the company only while it carries out the terms of the contract.

It does not follow from all that has been done thus far toward solving the pole nuisance that every impediment to their removal is fully overcome. Already there is a menace of litigation from disappointed contractors whose applications for a contract were ignored. Nor is it clear that the Union Telegraph Company, with its large resources and litigious propensities, will at once submit to control and supervision in the disposition of its wires. But it is a relief to see so difficult a problem approaching so near to a satisfactory solution.

A 93 per cent. water motor is the latest novelty in the English machinery line. It was first shown last year at the International Inventions Exhibition, at London, but at that time seemed to attract very little attention, except perhaps on account of the crudity of its design and its general air of inefficiency. Now, however, the inventor makes for it the startling claim of a return of 93 per cent. of the available work, and prominence is suddenly given to a device which certainly seems to have very little to favorably commend it. Simplicity, in fact, seems to be the only good feature about it, but this alone cannot outweigh other considerations in the matter of economy. Briefly described, the motor consists of two horizontal shafts placed one above the other and furnished each with a pair of wheels, over which pass a pair of chains. Between these at certain intervals are placed floats which pass down a rectangular inclosing casing of any desired size under the pressure of water upon them, and thus perform the offices of a series of pistons in a working cylinder. Arrived at the bottom of this casing the floats pass around the lower pair of pulleys, permitting the escape of the water, and ascend on the other and open side to perform the same work over and over again. The principle of the motor, it will be understood, is based on the proposition that water has

no force but its weight, and the inventor argues that the machine which utilizes that weight in the most economical manner must be the best. For several reasons, however, it would be difficult to attempt any comparison of the merits of the device with those of the older and well-established forms of water motor, there being, among other things, and as is not at all uncommon in similar cases, a characteristic absence of reliable figures. A test, we understand, has been made, but unfortunately the results are not made public. For friction and leakage of the water, though the latter is claimed to have no effect, and for friction of the chains, floats, &c., dependence must therefore be placed entirely on the inventor, a circumstance by no means calculated to inspire faith when we read of an efficiency of 93 per cent.

The Law and the Boycott.

It is a curious fact that, among all those who have suffered from blacklisting in the journals devoted to promoting boycotts, an English subject, Mr. T. R. Wyles, residing and doing business in Baltimore, is the first to seek the protection which the law offers, but does not afford unless invoked. In other cases the complaint has been based upon overt acts clearly criminal in their nature. In the Baltimore case the offense consisted simply in announcing the name of the complainant as one with whom workmen should do no business. As a customer of a boycotted firm, Mr. Wyles was blacklisted by the *Labor Herald*. Not liking this sort of thing, Mr. Wyles made application to a United States court for an injunction, which was promptly granted. Encouraged by this very natural and commendable procedure other injunctions have been sought and obtained, and the *Labor Herald* will probably find it inconvenient to maintain a black-list any longer, although the candidates for that honor are probably more numerous now than they were before the litigation began. Gradually we are getting the law of conspiracy pretty well defined. We do not move quite as quickly in such matters as some other nations might, but we are reasonably sure-footed and seldom take a step backward.

The history of the Baltimore case is instructive. The language of the injunction granted by Judge Bond on the petition of Mr. Wyles not only recognizes in the clearest terms the criminality of the conspiracy to break down a lawful business, but it goes much further than the Connecticut judge went in his charge to the jury, upon which boycotters were convicted at New Haven. Judge Sanford held that trades unions had a right to agree among themselves to discontinue buying the goods of another, and also to request their friends and others to do likewise. But Judge Bond expressly prohibits any effort by advice or request to influence other persons against the business assailed. Of course it is impossible to enforce such an injunction literally, but it will undoubtedly have the effect of stopping the efforts now made with so much publicity to keep alive boycotts which would otherwise die out and be forgotten. Whispered conspiracies and secret boycotts are not likely to be felt by those against whom they are directed.

The Advance in India-Rubber.

The recent improvement in an article of such universal use in manufacturing as india-rubber has been the subject of a good deal of discussion of late in mercantile circles. The export from Para, in Brazil, usually ranges between 7500 and 10,000 tons, and of this we received during the fiscal year 1885 14,395,413 pounds, or about 6400 tons. In other words, the United States consume in normal years about 65 per cent. of the entire Para export. This year the consumption of Para rubber among us has been unusually large, for during the first six months of the year it amounted to 10,000,000 pounds, against 7,200,000 pounds during the corresponding period of 1885. While consumption has increased, the stock of Para rubber in Europe and America has been reduced to 1000 tons, and under the impulse of the combined demand at Para the price there has steadily risen. In January and February the price of prime Para here ranged between 61 and 64 cents; during the spring it gradually advanced to 75 cents, and subsequently, in June and July, rose to 82 cents.

The general import of india-rubber into the United States was during the calendar year:

	1885.	1884.
	Pounds.	Pounds.
Re-export.....	25,482,850	23,672,583
	917,199	596,821
Net import.....	25,115,277	23,078,942
Import During the First Four Months.		
	1886.	1885.
Re-export.....	10,888,611	9,016,366
	73,065	114,510
Net import.....	10,815,566	8,901,856

It will be seen that the import of all sorts has so far this year shown a greater excess even over the previous year than was the case in all 1885; yet all other kinds of rubber have advanced in price proportionately as much as Para. Although the movement this year is again partly speculative between Europe and America, it appears to have a better basis than what it had four years ago, and therefore inspires more confidence. As the production of rubber is limited to a few localities, and not capable of sudden mate-

rial increase anywhere, while consumption, on the contrary, may, from some cause or another, be susceptible of a notable increase, it is evident that there is room enough for a further advance till the equilibrium between the supply and demand is restored, as it has been during the past three calendar years.

The Philadelphia mills have conceded the demands of their men, who went out on a strike about four weeks since, by signing an agreement till June 30, 1887, in which a 2-cent card is accepted as the minimum of the scale, the price of puddling to be \$3.85 per ton and 15 cents extra for the helpers, making it \$4. For every tenth of a cent advance up to a 2.5-cent card rate the price of puddling will be advanced 10 cents. On a 2.5-cent rate the price is therefore \$4.35. Then every two-tenths of an advance in the card rate bring an increase of 25 cents in the price until 3 and 3.1 cents is reached, the price being then \$5.10. Up to a 4.20 and 4.30 cent rate an advance of two-tenths brings up the price of puddling 30 cents, and above that a more rapid rate is adopted. We tabulate the figures as below:

Card rate.	Price for puddling.	Card rate.	Price for puddling.
2.0.....	\$3.85	3.4 and 3.5.....	\$5.70
2.1.....	3.95	3.6 and 3.7.....	6.00
2.2.....	4.05	3.8 and 3.9.....	6.30
2.3.....	4.15	4.0 and 4.1.....	6.60
2.4.....	4.25	4.2 and 4.3.....	6.90
2.5.....	4.35	4.4 and 4.5.....	7.25
2.6 and 2.7.....	4.60	4.6 and 4.7.....	7.60
2.8 and 2.9.....	4.85	4.8 and 4.9.....	7.95
3.0 and 3.1.....	5.10	5.0 and 5.1.....	8.30
3.2 and 3.3.....	5.40		

In addition to this the employing firm pays the helpers 15 cents a ton. One-third of the above rates go to the helper. This, it will be observed, is a material advance, especially at a time when the actual rolling price is about 1.75 cents. With foreign steel billets selling as low as they do, the Philadelphia puddlers are giving the substitution of steel for iron a vigorous impetus.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 27, 1886.

The two Houses of Congress in these last moments of the session are making desperate efforts to do something which will redeem them in a measure from the charge of having expended 240 days in useless debate, and without offering to the country a single act of necessary concurrent general legislation. The only prospects at this juncture are that the appropriation for additional ships will go through. But even this threatens to come out in such a bungling manner that there is danger that while the money will be available for the building of the hulls it will not be for the purchase of armor and armament. The attention of the Senate Committee has been called to this ambiguity in the bill, which will doubtless lead to a remedy of the defect. There is hardly a doubt but that this bill will get through. There is not much chance, however, for interstate commerce.

THE SENATE AND BIG GUNS.

The responsibility for the imbecility of Congress belongs to the House. But for the Senate the parsimonious policy of hypocritical retrenchment to be supplied by deficiency bills would seriously cripple the Government. The House Fortification Appropriation bill is a fair sample. The House proposition was to appropriate \$500,000 in bulk for seacoast defenses. The Senate offers a substitute for the purchase, manufacture and erection of the necessary plant for finishing and assembling heavy ordnance at the Frankford Arsenal, Philadelphia, the completion of the two 10 inch breech-loading steel guns, &c., \$400,000. The Senate also appropriates \$60,000 for 10 12 inch muzzle-loading cast-iron mortars, or six with steel bands, to be contracted for with the South Boston Iron Works. The Senate committee also adds a new section appropriating \$6,000,000, to the following effect: "That the Secretary of War and the Secretary of the Navy be authorized to make contracts with responsible steel manufacturers, after suitable advertisements, to continue not less than 30 days in newspapers most likely to reach the manufacturers addressed, for the supply of rough-bored, rough-twined and tempered steel in forms suitable for heavy ordnance adapted to modern warfare for army and navy purposes, in quantity not to exceed 10,000 gross tons, in quality and dimensions conforming to specifications, subject to inspections and tests at each stage of manufacture, and including all the parts of each caliber specified; provided, that no money shall be expended except for steel delivered; that each bidder shall contract to erect in the United States a suitable plant, including the best modern appliances, capable of making all the steel required and of finishing in accordance with the contract, and agree in the case of an ordnance contract to deliver yearly a specified quantity of each caliber; the time of delivery of smaller calibers to commence at the expiration of not more than 18 months, and the largest calibers at the expiration of not more than three years from the date of execution of the contract; and all the forgings shall be of American product and manufactured in the United States, and one-half of the material purchased under this provision shall be for the use of the War Department and one-half for the use of the Navy Department in the armament of ships heretofore or hereafter authorized by Congress, and for the purpose of the foregoing provision the sum of \$6,000,000 is hereby appropriated, to be available for six years from the date of the execution of the contract."

A CHANCE FOR THE STEEL-MAKERS.

It is understood that, should this amendment become a law, several prominent steel concerns will contract to deliver within 12 months the parts of the best modern steel guns of 8 and 10 inch caliber, and within three years parts of 10, 12 and 16 inch guns.

The forgings of the 8 and 10 inch guns have all thus far been made abroad. The adoption of the Senate amendments to the Fortification bill will open a new era in ordnance building in the United States. It will not only develop the skill of our own ordnance manufacturers and engineers, but will increase the demand for high grades of steel and better qualities of iron. The attitude of our people will soon create a foreign demand. A recent inquiry shows that the Armstrong ordnance and material of England are a failure, which our people could profit by through a sagacious policy on the part of our own Government. With a liberal appropriation for additional ships and seacoast defenses, industry would be stimulated and Congress might be relieved of the charge of total imbecility.

CONVICT LABOR.

The Senate on Monday, by unanimous consent, took up and passed the House resolution authorizing and directing the Commissioner of Labor, under the direction of the Secretary of the Interior, to make a full investigation as to the kind and amount of work performed in the penal institutions of the several States and Territories of the United States and the District of Columbia, as to the methods under which convicts are or may be employed, and as to all the facts pertaining to convict labor and the influence of the same upon the industries of the country, and embody the results of such investigation in his second annual report to the Secretary of the Interior, provided that the investigation authorized can be carried out under the appropriations made for the expenses of the Bureau of Labor.

The Acting Secretary of the Treasury has rendered the following decisions upon the construction to be given to acts of Congress relating to the metal schedules of the tariff:

STEEL IN SHEETS.

"In case steel in sheets or plates is 'galvanized or coated with zinc or spelter or other metals, or any alloy of those metals,' it pays, in addition to the rates prescribed in Paragraph 177, a duty of $\frac{1}{4}$ cent per pound under Paragraph 151; that is to say, steel in sheets valued at over 4 cents and not above 7 cents per pound which has been galvanized or coated as aforesaid would pay a duty of $\frac{1}{4}$ cent per pound, and besides be subject to the proviso of Paragraph 177."

CLASSIFICATION OF COPPERED WIRE.

After an inspection of the sample and a careful consideration of the reports received in this case, the department is of the opinion that the wire in question is properly dutiable under the provisions of T. I., new, 182. The wire is not the "galvanized" wire provided for, but it is coppered wire. Coppered wire was specially provided for in the old tariff; also that "all descriptions of iron wire, and wire of which iron is the component part, should pay the same duty as * * * coppered wire." These two provisions have been consolidated in the general terms "iron and steel wire," intended to cover all wire except "galvanized" wire, including coppered wire. Further, the second proviso states that "no article made from iron or steel wire, or of which iron or steel wire is a component part of chief value, shall pay a less rate of duty than the iron or steel wire from which it is made, either wholly or in part." It follows, therefore, that the wire in question cannot be assessed under T. I., new, 216, inasmuch as the general appraiser at Baltimore reports that the rate provided in T. I., new, 182, for iron or steel wire is higher than the rate provided in T. I., new, 217, "for manufactures in part of metal," &c. The entry was amended accordingly.

GILT AND PLATED NAILS.

In an appeal from an assessment of duty at 45 per cent. on certain gilt and plated nails and claim for 35 per cent. the Acting Secretary decides that: "The appraiser reports that the articles are nails with brass heads, which latter are coated, respectively, with an exceedingly superficial deposit of silver and gold, upon which a lacquer has been applied, and that, in his opinion, this coating does not make the nails 'plated and gilt articles' within the meaning of the law. The department concurs in this opinion so far as the silver-headed nails are concerned, as they are evidently merely washed with silver, and not plated."

SAFETY-VALVES ON STEAM VESSELS.

The rules governing the use of safety-valves on steam vessels have been amended as follows: "The rule requiring 'an area of not less than 1 square inch to 2 square feet of the grate surface will hereafter apply to the common lever safety-valve and to spring-loaded valves which are not constructed so as to give an increased lift by the operation of steam.'"

LINEN POCKETS FROM THREADS OF LINEN AND METAL.

On an appeal from an assessment of duty at 45 per cent. on so-called linen pockets the department rules: "From an inspection of the sample submitted it appears that the pockets in question are made of a material composed of linen and metal threads woven together, and you report that duty was levied thereon at the rate of 45 per cent. ad valorem. The assessment of duty is affirmed."

Among the latest synopses of decisions of importance in customs cases are the following: "The cost of royalty on an imported article should be included in the dutiable value thereof when it appears that such royalty was actually paid to the patentee, and that it entered into and formed a part of the cost of the article to the purchaser. Pieces of sawed wood of different shapes and dimensions, provided with holes, planed, &c., which can be fitted together so as to form a complete reel for barbed wire, are dutiable as manufactures of wood, under the provision therefor in T. I., new, 233, and not as wood, unmanufactured. Payments for refunds of excessive duties exacted on importations cannot be made to attorneys unless the entries have been made by them as consignees or as agents in the name of the owners when the owners are absent or sick; in the latter case checks for such payments should designate the attorneys as agents. A hoisting and pumping engine permanently fastened to a ship's deck for its exclusive use, and not intended to be detached and landed or transferred to another

vessel, and which is part of the ship's necessary equipment, is not an importation, and is not liable to duty."

NEW PUBLICATIONS.

THE TECHNO-CHEMICAL RECEIPT BOOK. Edited from the German, with additions by William T. Brandt and William H. Wahl. Size 5 x 7 1/2 inches, 485 pages. Published by Henry Carey, Baird & Co. Price, \$2.

It is almost needless to say that this book contains a vast amount of information, practical, in condensed form and readily accessible. It is essentially what it claims to be—a receipt book—and all theoretical reasoning and historical detail have been omitted. The collection is one of approved receipts and processes of practical application in the industries and for general purposes, and there can be little doubt that it will prove of the utmost value and convenience. Every one who has had occasion to search for information of the kind which the book contains knows the laborious character of the work of looking up formulae and the directions for carrying out certain operations, and the saving of time and trouble which could be effected by having these particulars at hand in a well-arranged form. The assurance is, moreover, given that the receipts are of the best. The best and latest authorities have been resorted to, and innumerable volumes and journals have been consulted in the translation and compilation, and wherever different processes of apparently equal value for attaining the same end have been found more than one has been introduced. The material has been principally derived from German technical literature, which is especially rich in receipts and processes on which reliance can be placed, and most of them, we understand, were practically tested by competent men before they were given to the public. The index, which in a work of this kind is of great importance, has to all appearances been made the subject of careful study, and covers over 30 pages. This, with a long table of contents, will make it an easy matter to refer to any subject or special receipt.

The Second Geological Survey of Pennsylvania have made a commendable departure in issuing advance sheets of their publications in the form of pamphlets containing the different reports. Formerly these were sent out in bound volumes. We are not sure whether the Survey intend to offer these pamphlets for sale as such, a course which many would be grateful for. We review below those of the reports which are most likely to be of interest to our readers.

SECOND REPORT OF PROGRESS IN THE ANTHRACITE COAL REGION. Part II. By Charles A. Ashburner, Geologist in Charge.

In 1883 Mr. Ashburner published his first report of the anthracite survey, outlining the plan to be followed in this important work. In his second report, of which advance copies have just been issued, he states that the demand on the part of those actively engaged in the working of the anthracite collieries was rather for the maps and sections than for the text of the reports, and accordingly his efforts and those of his reduced corps of assistants have been directed toward furnishing surface and underground field work, the maps being issued as rapidly as possible. Since the first report, which was descriptive of the detailed maps of the Panther Creek basin, the eastern end of the Potomac or Southern coal field, between Mauch Chunk, on the Lehigh, and Tamaqua, on the Schuylkill River, three large sections of the anthracite regions have been mapped. They embrace in the Northern Field six sheets, covering Nanticoke, Warrior Run, Plymouth, Ashley, Kingston and Wilkesbarre; in the Eastern Middle Field Drifton and Hazleton, and in the Western Middle Field Delano, Shenandoah, Girardville and Ashland. These have been completed. Partial surveys have been made in the vicinity of Shickelshinny, and Pittston, between Scranton and Carbondale, in the Northern Field, and between Ashland and Shamokin, in the Western Middle Field. The report contains a chapter on the classification and composition of anthracite, the greater part of which has been anticipated in papers read before the American Institute of Mining Engineers. Succeeding chapters give a general description of the Southern, Western Middle, Eastern Middle and Northern coal fields.

PRELIMINARY REPORT ON OIL AND GAS. By John F. Carl.

BORINGS FOR OIL IN JACKSON AND ABBOT TOWNSHIPS, Potter County. By Chas. A. Ashburner. SOME GENERAL CONSIDERATIONS OF THE PRESSURE, QUANTITY, COMPOSITION AND FUEL VALUE OF ROCK GAS. By J. P. Lesley.

These three reports are printed in one small volume of about 110 pages. Mr. Carl's will be read with particular interest, since the author is undoubtedly the best-informed geologist on the subject of oil, and is devoting much attention to gas. His preliminary report covers the happenings of the last three years in the oil territory, years crowded with events which he summarizes as follows: The history of three years records the outlining and the steady decade of the Great Bradford and Allegheny oil fields; the renewal of extensive operations in the white sands of the Venango-Butler group; the rise and fall of Cooper, Henry's Mill, Balltown and Wardwell pools, in Warren and Forest counties; the rocket-like career of Thorn Creek, in Butler County; the opening of Kinzua, in Warren County; Red Valley, in Venango County; Cugley Run, in Clarion County; Washington, in Washington County, and several other pools and extensions in the oil districts. Mr. Carl states as a rather remarkable fact that no new productive horizon has been discovered since 1882. He gives sections showing the positions of the several oil and gas producing horizons relatively to the key rocks, which are the Olean conglomerate along the northwestern and northern outcrop, the Sub-Olean, in Forest and Elk counties, the Ferriferous limestone, in the Butler and Clarion fields, and the Pittsburgh coal bed and Crinoidal limestone, in the vicinity of Pittsburgh. A second chapter treats of the probable in-

crease, stability or decline of the oil production in the different districts, as dictated by their more recent history, which are shown on a map accompanying the report, together with the gas pools now being exploited. The explanatory notes relating to this feature of the map fill the third chapter. A fourth criticizes the many theories relating to oil and gas. Then follows one of the admirable papers by Mr. Lesley, in which he takes strong ground against the position often taken by oilmen and the community at large that the Geological Survey is merely collecting facts established by drilling, that it follows instead of leading the driller, and that therefore its utility to that interest is a very modest one. Mr. Lesley quotes at length an article published by Mr. Carl in 1876, in which it is clearly shown that the work of the Survey has been in advance of the knowledge possessed by citizens of Western Pennsylvania. In a paper added at the end of the volume Professor Lesley discusses the pressure, quantity, composition and fuel value of natural gas, incidentally arguing against the calculation put forward in *The Iron Age* by Dr. H. M. Chance some time since. He closes this paper with a reply to a question which probably has been uppermost in the mind of every great consumer of coal for the last two years, "Shall I bore for gas at my works?" He answers it as follows:

First of all, there can be no gas stored up in the oldest rocks. This at once settles the question in the negative for the whole southeastern third of the State. To bore for gas in Bucks, Montgomery, Philadelphia, Delaware, Chester, Lancaster, York or Adams counties would be simply absurd.

Secondly, there can be no gas left underground where the old rocks have been turned up on edge and overturned, fractured and recemented, faulted and disturbed in a thousand ways. If there ever was any, it has long since found innumerable ways of escape into the atmosphere. This settles the question in the negative for all the counties in the great valley: Northampton, Lehigh, Berks, Lebanon, Dauphin, Cumberland and Franklin, as any one can see by looking at the present condition of their limestone, slate and sandstone formations.

Thirdly, there is not the least chance that any gas is left underground in the greatly folded, faulted, crushed and hardened formations of the middle belt of the State—Carbon, Schuylkill, Lehigh, Luzerne, Columbia, Montour, Northumberland, Union, Snyder, Lycoming, Perry, Juniata, Mifflin, Center, Clinton, Huntingdon, Blair, Bedford and Fulton counties. Where the oil and gas rocks rise to the surface in these counties, as they do in a thousand places, they show that all their oil and gas has escaped long ago.

Fourthly, where the rock formations lie pretty flat and have remained nearly undisturbed over extensive areas, as in Wayne and Susquehanna, parts of Pike and Lackawanna, Wyoming, Bradford, Tioga, Potter, and all the counties west of the Allegheny Mountains, there is always a chance of finding gas, if not oil, at some depth beneath the surface determined by the particular formation which appears at the surface; but as yet we have no satisfactory evidence of the existence of quantities of rock gas in any of these counties east of Potter.

Fifthly, wherever the bituminous coal-beds have been changed into anthracite or semi-bituminous coal it is reasonable to suppose that the same agency which produced the change, whatever it was, must have acted upon the whole column of formations, including any possible gas rock at any depth.

Sixthly, wherever rock oil has been found, there and in the surrounding region rock gas is sure to exist.

REPORT ON THE CORNWALL IRON ORE MINES, LEASAGE COUNTY. By J. P. Lesley and E. V. D'Inville.

The greater part of this valuable report has been used in substance in Mr. D'Inville's paper read before the American Institute of Mining Engineers, full abstracts of which were printed in *The Iron Age* at the time. It is a matter of some surprise to us that Mr. D'Inville does not emphasize more the growing use of Cornwall ore for Bessemer purposes, since that is a factor which is giving mining of the Cornwall deposits a very great impetus.

THE VEGETABLE ORIGIN OF COAL. By Leo Lesquereux.

The venerable fossil botanist of the Survey, as his title appears to be, Leo Lesquereux, now 80 years of age, contributes a small monograph, which is certainly the clearest popular review of the much discussed subject, the origin of coal, which we possess. Mr. Lesquereux is an ardent advocate of the bog theory. A life-long study of peat deposits in many parts of the world has enabled him to marshal an array of data from the convincing inferences of which it is indeed difficult to escape.

NOTES ON THE QUANTITARY GEOLOGY OF THE WYOMING LACKAWANNA VALLEY. I. Description of the Arch bed Pot-Holes; also of the Buried Valley of Newport Creek, with Special Reference to the Nanticoke Mine Disaster. By Charles A. Ashburner. II. Description of the Buried Wyoming Valley between Pittston and Kingston. By Frank A. Hill. III. Description of a New Substance Resembling Doplomite from a Post-Glacial Peat Bog at Scranton. By Prof. Henry Carville Lewis.

At the Bethlehem meeting of the American Institute of Mining Engineers, Mr. C. A. Ashburner developed his explanation of the Nanticoke disaster, which is more fully carried out in this report, which is accompanied, too, by two excellent heliotype photographs of the Archbed pot-holes.

REPORT ON THE BERNICE COAL BASIN, IN THE LOYALOCK AND MEKOPANY COAL FIELDS, SULLIVAN COUNTY. By C. A. Ashburner. Accompanied by Notes on the Mekopany Coal Field. By Frank A. Hill.

The Bernice or Loyalock coal field has been one of the most interesting to the coal trade in some respects, having furnished food for considerable controversy, only a few years since, on the point whether or not it is an anthracite. The Geological Survey has come to the aid of the State Line and Sullivan Railroad Company in pronouncing it to be so. It has the structure and physical appearance of bituminous coal and the composition of an anthracite coal. Mr. Ash-

burner says: "Not until the Geological Survey had made numerous analyses of the Bernice coal, and had shown that it possessed a composition which would entitle it to be called an anthracite more than some of the softer anthracites mined from the western part of the anthracite region, and until the operators had designed a mechanical method of preparing the coal, and had removed the prejudice of the coal trade and consumers against the coal, which they had always been disposed to regard as bituminous and not anthracite, was the coal rated by the trade either as a competing fuel of the soft anthracites or as a specialty. The free-burning character of this coal, the property it possesses of continuing to burn under conditions in which fires made of other coals would go out, the easy, complete combustion of the carbon in the coal, and the open-like tendency of the ash which results from combustion, and which seldom has a tendency to clinker, render the coal a desirable fuel."

2. NOTES ON THE MOUNTAIN LIMESTONE IN THE WASHINGTON COUNTY GAS WELLS. By Prof. ALBERT LINTH and EDWARD LINTH.

3. THE COAL BEDS AND FIRE CLAYS OF THE WELLSBURG BASIN, SOMERSET COUNTY. By J. P. Lesley.

4. REPORT ON THE TIPTON RIVER COAL OPENINGS, BLAIR COUNTY. By C. A. Ashburner.

Mr. D'Inville has undertaken the work of carefully studying the geological structure of the Great Pittsburgh Bed, which, Professor Lesley says, contains available for market 5,000,000,000 tons—enough to last for centuries. This closer study will locate more accurately the anticlinal and synclinal; in fact, in one case—the Peters Creek axis—the Survey has already revised former work. In speaking of the coal from the Pittsburgh bed, Mr. D'Inville says: "There seems to be no fairly defined line of demarcation as between gas, steam or cooking coal. Analysis and structure reveal nothing; but practice, the characteristics of the coal, and perhaps sometimes a little prejudice, have fixed these limits as they now exist. A peculiar instance of this arbitrary rule is the grading of coals of the various pools along the Monongahela River, and the affixing of varying prices in the markets of the country for their product which is frequently not warranted by any difference in the coal itself. There is some variation occasionally and often within narrow limits of area, but no law for this fact has yet been satisfactorily applied."

1. THE ORIGIN AND DISTRIBUTION OF THE DELAWARE AND CHESTER KAOLIN DEPOSITS. By J. P. Lesley.

2. REPORT ON THE BRAKDYNE SUMMIT KAOLIN BED. By C. A. Ashburner.

3. REPORT ON THE WYOMING VALLEY LIMESTONE BEDS. By C. A. Ashburner. Accompanied by a Description of the Fossils Contained in the Same. By Prof. Angelo Heilprin.

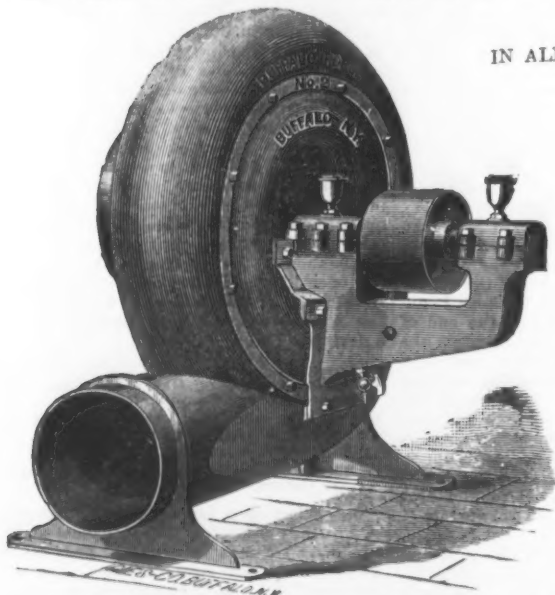
Old Roman Lead.—Recently, while the excavations for the new gasholder tank at the Chester, England, gas works were in progress, a pig of Roman lead in excellent preservation was discovered at a depth of 23 feet below the ground. It bears on its upper surface the following inscription: "IMP VESP AVG V T IMP III," while on the side is inscribed "DE . CEANGI." Its weight is 192 pounds. The translation of the inscription is that it was a pig of lead, a tribute to the Roman power from the tribe in North Wales commonly known as the Ceangli. The inscription tells us that it was cast during the fifth consulate of the Emperor Vespasian and the third consulate of Titus. This synchronizes with our date A. D. 74, and consequently it may be assumed that the pig of lead has been lying where it was found some 1800 years. The ground wherein it was discovered was gravel and marl, which evidently formed part of the old river bed. Close to it was found a human skull, and another was discovered about 15 feet away. The skulls and bones of horses and bullocks were also met with in or about the same place. The foreman of the works, Mr. J. Fish, at once called the attention of the company's engineer, Mr. F. W. Stevenson, Assoc. M. Inst. C. E., to the discovery, and the treasure trove was placed in safe keeping. As the ground has to be excavated 3 feet further discoveries may be expected.

A correspondent of the *Engineer* writes as follows: "The Belgians are competing with the North of England in bridgework and other material in a somewhat unpleasant manner. A short time since a steamer arrived in the Tees from Antwerp with 600 tons on board for India. It was immediately unloaded and transferred to a large export vessel about to sail for Bombay. A quantity of material used in and about mines, such as girders, rails, locomotives, winding engines, pulleys, wire ropes, and so forth for the production of which the North of England is eminently suited, is now going to Spain from Belgium and Germany, and English producers are not even invited to quote. The reason for this is that the Spanish import duties favor those countries, to the disadvantage of this country. The Belgian bridge and girder work appears, in finish and in quality of material used, much inferior to the English, but cheapness, arising from less duty, settles the question in nine cases out of ten."

The bill providing for the increase of the navy was so amended as to authorize a contract with the Pneumatic Dynamite Gun Company, of New York, for one dynamite gun cruiser, to be not less than 230 feet long by 6 feet breadth of beam, 7 1/2 feet draft, 3200 horse-power and guaranteed to attain a speed of 20 knots an hour, and to be equipped with their pneumatic dynamite guns of 10 1/2-inch caliber, and guaranteed to throw shells containing 200 pounds of dynamite or other high explosives at least 1 mile, each gun to be capable of being discharged once in two minutes, at a price not to exceed \$300,000.

The Union Dry Dock Company, of Buffalo, are to build a steel steamer which will be the largest of any ever built for the lakes. She will be 310 feet keel, 335 feet in length over all, 42 feet beam, and 26 feet depth of hold, with a carrying capacity for 3000 tons of freight. Her cost will be \$225,000.

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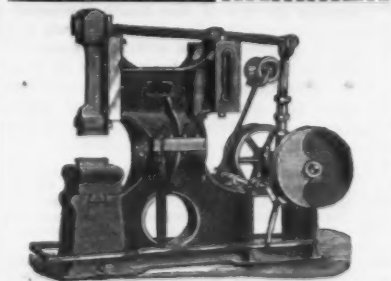
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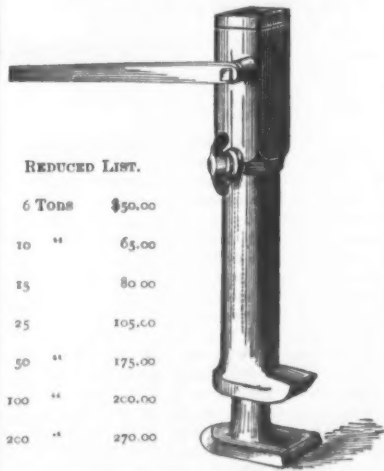
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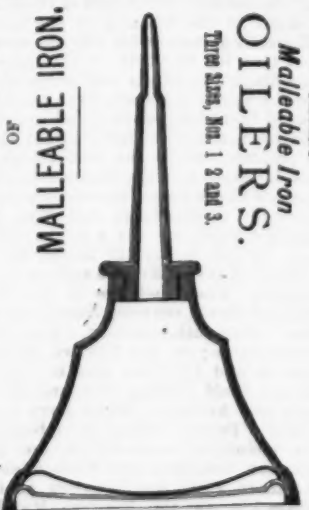
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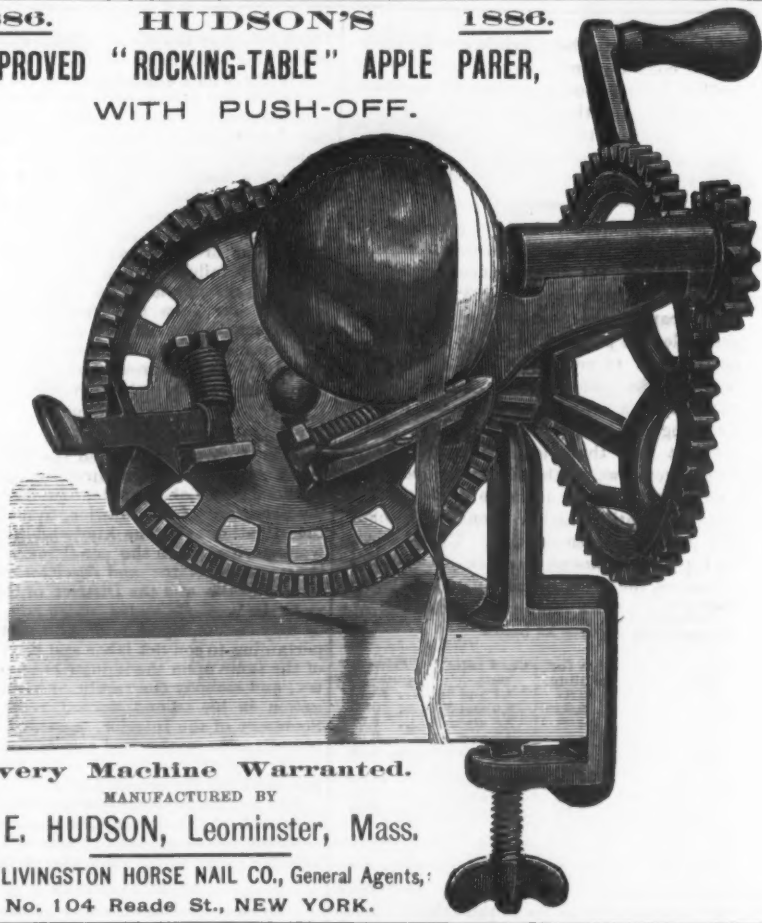
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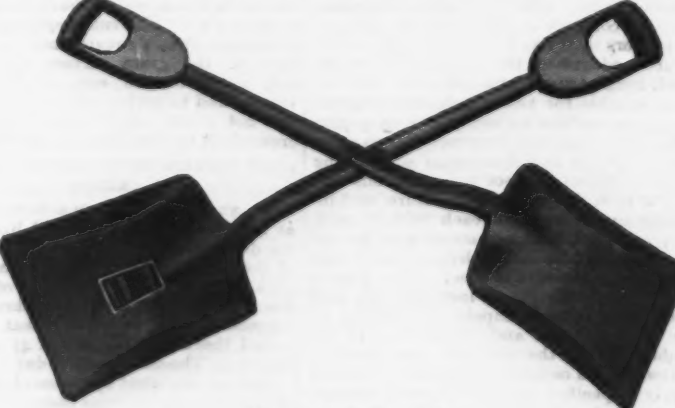
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Trade Report.

New York.

American Pig.—So far as Foundry Irons are concerned the situation remains practically unchanged. Consumers are taking a great deal of iron, and as a rule are hurrying deliveries, allowing their stocks to run low before they enter into engagements for further small quantities. The result is frequent embarrassment to furnace companies. We hear of some sales of Southern Irons for delivery during the fall. One of the leading furnace companies has declined to name prices for large blocks for delivery into next year. We quote standard brands Foundry No. 1, \$18 @ \$18.50; No. 2, \$17 @ \$17.50, and Gray Forge, \$15.75 @ \$16.25. On outside brands concessions of 50¢ are usual.

Scotch Pig.—Arrivals are light, the demand slack and little pressure to sell. We quote nominally as follows for small lots: Coltness, \$19.75 @ \$20 to arrive; Gartsherrie, \$19 @ \$19.25 to arrive; Shotts and Langloan, \$19.50 @ \$20 to arrive; Carnbroe and Glengaraock, \$18.50 @ \$19 to arrive; Summerlee, \$19.25 @ \$19.50 to arrive; Dalmellington, \$18.50 @ \$18.75 to arrive; Eglinton, \$17.50 @ \$18 to arrive, and Clyde, \$18 @ \$18.50 to arrive.

Bessemer Pig.—We hear of no business in Foreign Iron, nor does any seem probable in the near future, in view of the large quantities of Domestic Iron contracted for by the leading Steel companies, some of whom, in fact, have more than covered their requirements. During the past two weeks heavy purchases have been made of Domestic Bessemer on the part of importers of Foreign Ore. We quote nominally \$18 @ \$18.25 for Domestic Furnace and \$18.75 @ \$19 at tidewater for ordinary Foreign Bessemer.

Spiegel Eisen.—There has been no business of any consequence during the current week; prices continue nominally unchanged at \$25 @ \$25.25 for 20½ English, and \$24.75 @ \$25 for German.

Bar Iron.—Philadelphia mills have conceded the demand of the men, making the 2-cent card rate the minimum in the sliding scale of wages. This, however, is not likely to have much effect upon this market, which indeed hardly felt the stoppage of about a month. We continue to quote for delivery here in round lots: Common Iron, 1.05¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.75¢ @ 1.9¢. Store prices are 1.75¢ @ 1.80¢ for Common, 1.85¢ @ 1.90¢ for Medium, and 1.9¢ @ 2.2¢ for Refined.

Structural Iron and Steel.—The market has been quiet and steady during the week. We quote for Angles 2½ @ 2.10¢, delivered, and Tees at 2.40¢ @ 2.45¢, for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are nominally 3¢ base from dock for all orders.

Plates.—We quote for round lots: Common or Tank, 2.10¢ @ 2.20¢; Refined, 2¼¢ @ 2½¢; Shell, 2.4¢ @ 2½¢; Flange, 3.4¢ @ 3½¢; Flange, Extra 4¢ @ 4½¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.70¢ @ 2.75¢; Ship, 3¢; Shell, 3¼¢; Flange, 3½¢, and Fire-Box, 4¢ @ 4½¢, on dock.

Merchant Steel.—We quote nominally for the range of ordinary to good grades as follows: American Tool Steels, 7½¢ @ 9¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15½¢; common grades, 7¢ @ 9¢; Crucible Machinery, 3.75¢ @ 4.50¢; Round and Flat Spring, 2.25¢ @ 2.5¢; Round-Edge Tire, 2.25¢ @ 2.5¢; Square-Edge Tire, 2.5¢ @ 2.7¢; Toe Calk, 2.5¢ @ 2.6¢; Sleigh Shoe, 2.25¢ @ 2.5¢; Open-Hearth Machinery, 2.3¢ @ 2.6¢, and Bessemer Machinery, 2.1¢ @ 2.25¢, with freight allowance.

Steel Billets.—Inquiries are in the market aggregating about 7000 tons, chiefly for the Pittsburgh district. There is a sharp competition for this business between importers and the mills of the Pittsburgh district. These inquiries call for fall delivery, which it is somewhat difficult for importers to meet. We understand that the bulk of the Steel so called for is 2½ inch square Billets. We quote nominally \$28, which would be equivalent to about \$30 in Pittsburgh, or \$1 above that market.

Steel Wire Rods.—Business remains in the unsatisfactory condition in which it has been for some time, with occasional orders, for which low quotations are made. We quote nominally \$37 @ \$37.50.

Steel Rails.—We hear of sales aggregating about 12,000 tons, the bulk for fall delivery, although some small orders have been taken for early shipment from mill. The condition of affairs remains much the same as it has been for some time, the mills being well supplied up to September and October, but somewhat eager for work beyond that date. One of the leading Western Rail makers has been credited with the statement that toward the end of the year a slight decline may be looked for. We hear rumors of sales of Foreign Rails, the quantity named being about 10,000 tons, on the basis of about \$37.50 at New Orleans. It is stated also that one of the Steel mills which has a rolling capacity greater than its converter capacity has bought a round lot of

Foreign Roll Blooms. There are inquiries in the market also for Foreign Blooms to be used in rolling a 2000-ton lot of light Rails for a Southern road. The usual quotation for Foreign Blooms at tidewater is \$24.50 @ \$25.

Old Rails.—The demand continues very light, while the available Old Rails, especially in large blocks, are very heavy. They are not, however, offered at lower than \$18.75, tidewater delivery, while buyers rarely go as high as \$18.50. We hear of only small sales in this market during the current week, and quote \$18.50 @ \$18.75.

Scrap.—The market continues quiet at \$18.25 @ \$18.50 for No. 1 from yard, with the majority of the stock, which is small, held at higher figures.

Rail Fastenings.—Current business is small, the mills being employed pretty fully, however, on old orders. We quote nominally 2.40¢, delivered, for Spikes, with concessions for good orders; 1.80¢ @ 2¢ for Angle Fish Bars.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, July 27, 1886.

Pig Iron.—There is no special change of feature to notice, the demand being fair at about last week's prices. There is a better feeling, however, and holders show more confidence in values, and are less urgent in asking for bids, although as yet consumers are comparatively indifferent and are buying very carefully at about last week's prices. No. 1 Foundry is the firmest article on the list, the supply being extremely light, and in many cases furnaces are close sold up for some weeks to come. No. 2 Foundry is in abundant supply, but the demand is not large, and holders are glad to work it off as best they can. Mill Irons have been neglected for several weeks past, but with the starting up of the mills the demand is likely to be more in proportion to the supply than it has been. Prices, as already noted, are a little irregular, firm on No. 1 Foundry, but easy on other descriptions. Quotations vary according to character of the brand; some good Irons are available at \$18.25 @ \$18.50 at tide for No. 1 Foundry; others are firm at \$19 @ \$19.50, and in one or two cases special brands are held at \$20. No. 2 Foundry is quoted at \$17 @ \$17.50, but it is difficult to place large lots at over \$17 unless the brand is a specially good one. Gray Forge is showing a little more activity, but prices are unchanged, and probably will be until some of the accumulations of the past month or six weeks have been worked off. Good-sized lots have been taken, however—several of 500 tons each, some of 1000 tons each and numerous smaller lots. Prices realized have been about \$15.75 at tide for a fair quality of Gray Forge; others at \$16, and for what are considered as better qualities \$16.25 is asked, but as a rule \$15.25 @ \$15.50 at furnace are the asking prices. But the feeling is unquestionably becoming more confident, and, with prospects of a very heavy consumption during the balance of the year, there is little risk in saying that in all probability bottom prices have been reached, and a slight upward turn is only a question of time. Southern Irons are not offered in this market at present, although bids of \$15.50, ex-ship, for Gray Forge would not be likely to go far before meeting with a seller, but at less than that holders are evidently not anxious for business. A large number of local furnaces are running on Bessemer from Foreign Ore, which, for the time being, completely shuts out imports of Foreign Pig.

Foreign Irons.—There is considerable inquiry for Bessemer, but prices quoted so far are rather above buyers' ideas. At concessions of about 50¢ per ton large lots of both Bessemer and Spiegel would be taken, but holders are very firm. Special brands Bessemer held at \$19.50 @ \$19.75; others at \$19 @ \$19.25, c.i.f. Spiegel held at \$25.25 for 20½ and \$22 for 10 @ 12½. Large lots of all kinds are under negotiation.

Steel Blooms.—There is a considerable inquiry for Rail Blooms, and a good many thousand tons of Foreign have been taken at \$24.50 @ \$25, c.i.f., with prospects of further business at about \$25. Higher grades in demand at about the following figures: Slabs for Nail Plate, \$28.50 @ \$29.50 at tide for Foreign and \$30 at mill for Domestic, and from that to \$35 for higher qualities; special grades for Boiler Plates and other uses requiring high tensile strength, \$34 @ \$38. Other Blooms, per ton of 2464 lb, as follows: Charcoal, \$52 @ \$54; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$33 @ \$34, and Ore Blooms, \$34 @ \$35.

Muck Bars.—No change in prices. The demand is fair, with sales at \$28 @ \$28.50, according to quality and delivery.

Bar Iron.—The only feature of interest is the termination of the strike, the manufacturers having agreed to the demands of the men for a new schedule, with 2¢ as a minimum. Opinions differ as to the wisdom of this course, but, taking everything into consideration, it is probably the best that could be done. In the first place, it is unreasonable to expect Philadelphia to fight the battle for all the mills in the neighborhood. The price for puddling is to a great extent influenced by the Philadelphia mills. While the latter have been shut down the others have been running with the understanding that they (the country mills) are to abide by the

results of the Philadelphia strike. Under these circumstances it is not surprising that the men have been successful. There is nothing in the demand to change the position taken by the mill owners, but the presumption is that, as cost will be increased in the country as well as in the city, prices will be advanced in proportion, so that practically they will be situated just about as they were before the strike, unless Pittsburgh carries off the lion's share. Meanwhile Skelp orders will be very helpful, but there is nothing encouraging in the outlook for Bar Iron. There is more demand than there has been for some time, carbuilders being in the market for large lots, but at prices which will probably preclude all chance of Philadelphia mills taking any portion of the orders. Prices are nominally 1.8¢ @ 1.85¢ for Best Refined Iron, but some of the mill owners say they cannot get orders at any such figures, and will probably not start up until they see what prices are really going to be.

Plate and Tank Iron.—There is more inquiry for Plates, and for the time being mills are comfortably off for orders. Prospects are considered favorable, too, and the chances are that there will be a full average demand at slightly better prices. A fair amount of business has been taken during the week, and while prices are not notably higher sellers have had the advantage in recent transactions. Quotations are about as follows: Ordinary Plate, 2.05¢ @ 2.1¢, delivered; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—A slow, but gradual, improvement in demand is reported, although as yet it has been chiefly confined to small lots. There are some important orders pending, however, and mills will undoubtedly have all they can do during the balance of the year. Prices have not improved to any extent as yet, but there is a healthy and firm tone to the market, indicating better rates on any material increase in the demand. Sales at about the following prices: 2½ @ 2.05¢, delivered, for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—No special change to notice; the demand is a trifle better, but still somewhat irregular. The tendency is toward improvement, however, both as regards price and demand. Small lots are quoted about as follows:

Best Refined, Nos. 26, 27 and 28..... 3¼¢
Best Refined, Nos. 18 to 25..... 3½¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28..... 4¼ @ 5 ¢
Best Bloom Sheets, Nos. 22 to 25..... 4¼ @ 4½¢
Best Bloom Sheets, Nos. 16 to 21..... 3¼ @ 4 ¢
Blue Annealed..... 2.6 @ 2.75¢
Best Bloom, Galvanized, discount..... 60 ¢
Common, discount..... 65 ¢

Steel Rails.—There is no change to report; mills are all full of work, with plenty of additional business in sight. Prices are unchanged, \$35 at mill being the usual quotation, with some little concession on lots for winter and spring delivery. Foreign Rails are offered at about \$37, c.i.f., with some probability of sales for delivery in the South and West, because of the difficulty the home mills will have to supply them in time. Sales have not been of much importance during the past few days, but there is plenty of business around; the difficulty is to handle it so as to meet buyers' requirements as promptly as desired.

Old Rails.—Nothing doing in Spot Lots. Shipments are held subject to bids of about \$19.50 for T's, but there is very little demand. Lots at interior points command from \$20.50 to \$21 for good quality of Rails; same figures asked for lots in store here.

Scrap Iron.—A fair demand is reported, but prices are somewhat irregular, and in most cases about as follows: No. 1 Wrought Scrap, \$18; Selected do., \$19 @ \$20; No. 2 do., \$13 @ \$14; Turnings, \$14 @ \$14.50; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$18.50 @ \$20; Fish Plates, \$23.50 @ \$24; Cast Scrap, \$14 @ \$15; do. Turnings, \$10 @ \$10.50. A cargo of about 300 tons Fish Plates sold at \$24.25, f.o.b. cars Jersey City.

Wrought-Iron Pipe.—There is nothing new to report except a scarcity in large sizes, with a good demand. Prices are held firm and unchanged. Discounts as follows: Lap-Welded Black, 57½ ¢; Butt-Welded Black, 42½ ¢; Butt-Welded Galvanized, 32½ ¢; Lap-Welded Galvanized, 40 ¢; Boiler Tubes, 52½ ¢.

Nails.—The demand still continues quite brisk, while the general outlook seems to be improving. The impression seems to prevail that higher prices are probable in course of a few weeks. Prices are quoted at \$2.20, firm, for lots from store.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, Pa., July 27, 1886.

There has been no important change in the general business situation since our last report. The feeling is steadily gaining ground that there will be a good fall trade, and this has a good deal to do with its realization. It is expected that within a week or two orders for all kinds of manufactured goods will commence to come forward pretty freely, and there is no good reason apparent at present why these expectations should not be realized. One of the most encouraging signs of the times is an absence of the wild speculative mania which sometimes sets in when there is a prospect of a better condition of trade, as is the case at present. The railroads are criticized severely by furnace-

men here for carrying Southern Pig Iron from the furnaces South to this market at a much less freight rate relatively than is charged home furnaces. It is said that Pig Iron is being carried from Alabama and Georgia to Pittsburgh, a distance between 800 and 900 miles, for a little over \$4 per ton, whereas furnacemen in the Shenandoah and Mahoning valleys, a distance of about 75 miles, are charged 80¢ per ton from there to Pittsburgh, and the rate on Ore from Cleveland to Pittsburgh is \$1.50 per ton. Unless this matter is corrected in some way the railroads may look out for breakers. Furnacemen ask no favors; all they want is simple justice, and to this they are entitled. There is no disposition on their part to shut Southern Irons out of this market; all they want is an equalization in freight rates, and then, if the former can successfully compete with them in this market, all right.

Pig Iron.—There is a fair degree of activity, but the market is in an unsatisfactory and unsettled condition. The demand is chiefly for small lots, consumers generally refusing to anticipate future wants, notwithstanding current prices but little, if any, more than cover actual cost of production. Within a few weeks there has been a decline of fully 50¢ per ton. We can report sales of some 2000 tons standard Forge Irons at \$15.50, cash, against sales of same Irons not long since at \$16, cash. Southern Forge Irons, it is said, are being offered at from 50¢ to 75¢ per ton below the price of home-made, but consumers generally prefer to pay the difference for the latter. We repeat former quotations:

No. 1 Neutral Mill..... \$16.00 @ 17.00, 4 mos.
No. 2 Neutral Mill..... 15.50 @ 16.50, 4 "
All-Ore Mill..... 16.75 @ 17.00, 4 "
No. 1 Foundry..... 17.50 @ 18.00, 4 "
No. 2 Foundry..... 16.75 @ 17.00, 4 "
All-Ore Foundry..... 18.50 @ 19.00, 4 "
Charcoal Foundry..... 20.00 @ 21.00, 4 "
Cold Blast Charcoal..... 24.00 @ 27.00, 4 "
Bessemer Iron..... 18.50 @ 19.00, 4 "

The last sale of Bessemer Iron reported was at \$18.50, four months, but it is said to have been offered at \$17.75, cash, and intimations are thrown out that a bid of \$17.50, cash, would be considered. There appears to be no demand for the article at present.

Muck Bar.—We continue to quote at \$27 @ \$27.50, cash, and we can report sales at both of the prices quoted, although \$27.50, cash, is an extreme quotation, and can only be realized for a first-quality article.

Manufactured Iron.—Trade continues good for this month; mills are nearly all in operation, some of them working full, and the outlook for a good fall trade is very promising. Indeed, the indications are that business from now on until the close of the year will be better than during the same time for some years, as the reports from nearly all sections of the West and South are of a most favorable character. It is expected that orders from Agricultural-Implement makers will commence to come forward within a week or two. Mills making a specialty of Skelp continue to have about all they can do; some of them are working on it exclusively. Prices remain unchanged.

Nails.—There is a fair business for this month, and the indications are that August will show a continued improvement. Manufacturers as yet are not in condition to do much, having no assorted stock, but it is expected that they will be by the time the fall trade opens up. No change in prices: Iron Nails, \$1.90, 60 days, 2 ¢ off for cash, in carlots and upward, and Steel Nails, 10¢ @ 15¢ per keg additional. All the factories here are in operation excepting those of Zug & Co. and Moorhead Bros., and it is expected that the former will start up shortly.

Wrought-Iron Pipe.—The regular monthly meeting of the association took place in this city on the 20th inst., but there was nothing done of any importance to the general public; no change in prices, which are firm at combination rates. The next regular meeting takes place in New York. Discount on Black Butt-Welded Pipe, in carlots, 45¢; Galvanized do., 35 ¢; Black Lap-Welded, 60 ¢; Galvanized do., 42½ ¢. Boiler Tubes, 52½ ¢; 5½-inch Casing, 45¢ per foot, net; 2-inch Tubing 14¢; 8-inch Drive-Pipe, \$1.30.

Steel.—There has been but little change in the general position of the Merchant Steel trade recently. Demand fairly good, but prices are not satisfactory, and in this latter respect there is not much prospect of an early improvement. Standard brands Refined Cast Tool Steel, 8¢ @ 9¢; Crucible Machinery, 3¼¢ @ 4¢; Open-Hearth do., 2½¢ @ 2¾¢; Boiler Plate, 4¢ @ 4½¢.

Old Rails.—Old Iron Rails firm and higher. Sales have been made since our last report at \$22, delivered at Youngstown, and this may now be regarded as the ruling price. The demand here is chiefly for small lots, large consumers being pretty well stocked. Old Steel Rails, in absence of sales, quoted nominally at \$20 @ \$20.50 for short and \$22 @ \$22.50 for long lengths.

Railway Track Supplies.—There is a fair demand; no change in prices. Spikes, 2.40¢, 30 days, delivered; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.75¢, with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

Steel Rails.—There is still considerable inquiry, and the mills here, as elsewhere, are unable to accept additional contracts for August or September. Some of them, it is said, are sold up until the close of the year. We repeat former quotations, \$36 @ \$36.50, cash, at mill.

Old Material.—There is a fair business; prices unchanged. No. 1 Wrought Scrap,

\$17 @ \$18, net ton; Wrought Turnings, \$13 @ \$14; Old Car Axles, \$23 @ \$24; Cast Borings, \$11, gross; Old Car Wheels, \$15.50 @ \$16, gross.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, July 26, 1886.

Hardware.—Has assumed rather a quiet aspect. Orders for the moment are for odds and ends for sorting up stocks. Prices continue steady, with renewed indications from manufacturers of staple lines that they will make a strong effort to obtain higher prices on fall trade. Short crops in some portions of the West, caused by the extreme heat and drought, are the first unfavorable feature respecting the large demand anticipated. Rains during the latter part of the week, however, in sections where badly needed will to some extent relieve the apprehension of failure in corn crops, and re-encourage the despondent croakers. Inquiries are already very numerous for prices and possible shipments on several lines of goods, and in some cases orders are entered for September and October delivery. Chicago jobbers do not encourage this style of trade, and only accept such orders subject to price at time of shipment. We learn from traveling salesmen who have just returned from the Pacific Coast that the jobbing trade in that territory is exceedingly dull. During the low freight rates the majority of large retailers placed orders for goods with Eastern houses, and in many cases greatly in excess of their immediate wants. Jobbers at the same time bought heavily from manufacturers, and the result is that both classes of dealers are chock-full of stock, with a very light demand from consumers. The retailers complain that their trade has been dull, and it will require all the cash that they can raise to pay Eastern bills, compelling them to leave their accounts unsettled with home jobbing houses, which is vigorously objected to by the latter, and places them in an unenviable position in meeting their liabilities. It is said that the country is overstocked with goods, and that it is almost impossible to sell sufficient to pay traveling expenses at the present time. The falling of the building occupied by the Simmons Hardware Company, St. Louis, created great consternation among the trade here, and general sympathy was expressed for the unfortunate calamity that has occurred to this enterprising house. The details of the accident are as yet too meager to give a definite statement of the damage, but from information at hand it looks as though there would be a heavy loss on the stock.

Barb Wire.—There are no new points to note. The nominal quotation of 3½¢ for Painted Wire and 4½¢ for Galvanized by jobbers is made from store, but the price is openly cut to 3.35¢ and 4.10¢ in small lots to country dealers. There appears to be a decided weakness among manufacturers, with marked irregularity in price. There is at the moment no enthusiasm over the new organization under the name of the United Wire Company, but considerable secret work is in progress. As yet it is not thoroughly understood what the agreement of the new company will contain, and the majority of the prominent manufacturers are "holding their peace" and waiting developments.

Nails.—The conditions of the market are about the same as previously reported. From store in small lots Iron Nails are quoted at \$2.10 and Steel Nails at \$2.20, with 5¢ per keg off in carload lots. Since the announcement that Western mills have begun operations there is a great deal of complaining among heavy retailers and consumers regarding the quality of Eastern Nails. Western makers have not been running long enough to accumulate stocks of all sizes and cannot be said to be fairly in the market yet. Then, too, there are large jobbing houses who have the tail end of Eastern stocks on hand which they are desirous of disposing of before buying Western makes. For both Iron and Steel Nails the demand is reported as a very good between-season trade. Prices quoted are held quite firm and makers are not soliciting orders.

American Pig Iron.—During the past week some of the heaviest buyers have been in the market. Negotiations which were under progress for 10 days previous for lots ranging from 1000 to 7000 tons were closed without disturbing the condition of the market to any noticeable degree. There is always great competition to get these large orders, and manufacturers who secure them have a basis upon which to rely for the disposal of the year's product. It is not to be understood that these orders will absorb all the Iron produced by the contracting furnaces, but that they consume the greater portion, so that they can be more independent on the price on which they sell the balance. They do, nevertheless, have an influence on the prices named for less quantities, and several orders for from 100 to 300 tons have been placed at a trifle lower figure than was expected a week ago. The tone of the market, however, is very strong, and no one apprehends that prices that have been made or will be made hereafter can undermine its present position. While there are brands of Lake Superior Charcoal Iron on the market that cannot be bought for less than \$20.50 in carload lots, we quote average grades at \$19.50 @ \$20. These figures would not be accepted on all num-

bers, and would vary in accordance with the quantity of Iron contracted for. Coke Irons have not fluctuated much lately, and the quotation of \$19 @ \$19.50 in carload lots seems to be strictly adhered to. The nominal quotation of \$18 for Cinder Mixed Irons remains unchanged, though there are some dealers who say that they have no Iron that they could sell at this figure. In the Ohio standard Blackband Irons there is one grade which is quoted at \$20.50, and it is said that no orders are accepted at less than this figure. Other Irons of this class are quoted at \$19.50 @ \$20, carload lots, four months. The demand has been very good and furnacemen feel certain that they will have no trouble in disposing of their Iron during the fall, being therefore somewhat independent about accepting contracts for long-time delivery. The limited quantity of Blackband Ore that can be obtained places this grade of Iron somewhat out of the scale of competition and when a purchaser is looking for a strictly Blackband Ore Iron he has less stock to choose from than in either Coke or Charcoal Irons. The weakness that has characterized the grade of Southern Iron for some weeks past is still a prominent feature of the market. No. 1 Foundry is quoted at \$17.50; No. 2, \$16.50 @ \$16.75; No. 3, \$16; No. 3, \$15.50, in small lots. These Irons continue to be in bountiful supply, and sellers leave no stone unturned to obtain an order. Several heavy buyers are yet to be heard from, and the hope is entertained that when these have taken their supply for the year the market will assume greater strength and better prices will be obtained on the general run of trade.

Merchant Steel.—There has been only a light demand in a small way from store during the week. We learn, however, that several buyers have closed contracts for a year's supply at prices somewhat higher than what they paid last year. Very low contracts frequently incur unexpected losses, and the same house seldom duplicates an order of that kind. The harvesting machine makers are the heaviest buyers of this class of goods in the West and invariably place their orders at the bottom price. Those who had the orders last year placed their figures on the present specifications at a scale where they were pretty certain that, should they obtain the order, they would be able to make up some of the shortage on last year's business. As these points are fairly well understood by the trade, the placing of these large orders is having a good effect upon the market, though prices continue very irregular. As a nominal price we quote as follows: Tool Steel, 7½¢ @ 8¢; specials, 9¢ @ 13¢; Flat Crucible Machinery Steel, 4¼¢ @ 5½¢, according to quality; Round Machinery, 2¼¢ @ 3¢; Open-Hearth and Bessemer, 2¼¢; Plow Steels, 5¢.

Steel Rails.—The Steel-makers of this locality are wholly content with the present situation. They have all the work they can possibly do for the next two or three months, and are receiving orders for small lots that will likely fill up their works to the close of the year. There being no change in price we continue the quotation of \$38 for first quality and \$34.50 for seconds.

Structural Iron.—A slight improvement is noted in the demand for Beams, Channels and other structural shapes. Improvements and extensions on several lines of railroads in the West have brought into the market new demand for bridge material. On the latter class of Iron prices are said to be quite firm, as mills are pretty well employed and have in prospect sufficient work for several months ahead. We quote Beams and Channels, combination price, 3.10¢; Angle Iron, 2.50¢.

Tank Iron.—There has been quite a good demand recently for Tank material, both in Iron and Steel grades. Trade has been largely in small lots, on which we make the following quotations: C. H. No. 1 Flange, 4¢; Extra Flange and Flange Fire-Box, 4½¢; C. H. No. 1 Shell Iron, 5¢; Tank Iron, 2.40¢; Tank Steel, 3¢; Boiler Tubes, 5½¢ discount.

Bar Iron.—Jobbers of exclusively the best grades of Iron report that they are very busy. Trade in the last week has picked up remarkably well, and of course is somewhat of a surprise, as they did not expect much change for the better until next month at least. Inquiries for future delivery are much greater than immediate shipments on large quantities. Small lots from store on the best grades of Best Refined New Puddled Iron are quoted at 1.85¢ @ 1.90¢ and in carload lots from mill at 1.70¢ @ 1.75¢. On Merchant Bars from Old-Rail stock there is a great weakness in price, though manufacturers claim that they are quoting higher rates than some time ago. These statements are scarcely warranted on sales made from time to time, and all their attempts at getting better prices is a mere mockery, if transactions are a safe guide. From mill prices are quoted at 1.60¢, but on carbuilding specifications we hear of these prices being shaded ¼¢, and it is not certain that they do not make even lower figures. From store jobbers quote 1.75¢ rates. The placing of a large number of orders by carbuilders in the last 10 days has given the market an appearance of activity among manufacturers.

Black Sheets.—The demand for Black Sheets does not increase quite so rapidly as jobbers and makers anticipated. There is only a light trade in small lots in the ordi-

nary quality of Iron, which jobbers quote from store at 2.70¢ for No. 24, 2.80¢ for Nos. 25 and 26, and 2.90¢ for No. 27. The better quality of Iron is in greater demand in large lots and stronger in price. All manufacturers are asking higher prices from the jobbing trade.

Galvanized Iron.—The demand for Galvanized Iron is very irregular. Jobbers report that they have had less trade during the past week, and are apparently blue over the present condition of the market. Sales agents report some increase in the demand from furnacemen and manufacturers of goods for winter use. Jobbers continue the quotation of 60 and 10¢ off on Juniata, and 60, 10 and 5¢ off on Charcoal.

Scrap Iron.—Dealers quote No. 1 Wrought, \$17.50; No. 1 Mill, \$14.50; No. 2, \$9, and Cast Scrap, \$13.50, net ton. There appears to be an unusually good demand for the latter grade; sales of several round lots are reported. Other grades of Scrap are taken only in small lots. Buyers are indifferent about placing orders.

Pig Lead.—A fairly good local demand has characterized the market during the past week. Sales aggregate some 400 tons spot, at 4.70¢ @ 4.75¢, August delivery. Prospects for large consumption of Lead Pipe and Sheets are reported good and a steady market predicted. Supplies are not abundant, but ample for all immediate wants.

Birmingham.

BIRMINGHAM, ALA., July 26, 1886.

Last week was one of the busiest in Birmingham's history. It is probable, indeed, that the city never sold so many goods in six days before at any time of the year. An unusually brisk movement of real estate contributed to make the banks' business heavy, too. More capital is coming to Birmingham now for investment in ground in or near the city than ever before. A North Carolina syndicate and several Mississippians were among the largest buyers last week. The former paid \$400 an acre for poor land 4 miles from the city, with no minerals or other hidden possessions to give it value. Elsewhere in the State business, although not so brisk as in Birmingham, is at least more cheerful, and with good reason. According to the best accounts the crops still look very differently in different parts of the State, but undoubtedly their general condition is very much improved by the almost constant sunshine of the last two weeks. In certain districts now better than average fields of corn and cotton are promised.

Pig Iron.—Except for the fact that prices are still a little too low, the condition of the Pig-Iron market is all that manufacturers here could ask. The demand, which has been increasing steadily for several weeks now, enables them to clear their yards as fast as cars can be had, if they are willing to take market prices. Some are not much inclined to sell at prices now governing, and are selling little or no Iron except to customers who prefer their product to the point of paying even a fancy price for it. Buyers contracting here for future delivery would undoubtedly have to pay an advance on the present price. A good run of orders for from 1000 tons down is coming in, averaging about the same prices that governed a week ago.

Finished Iron.—It seems impossible to advance prices for Finished Iron. In spite of increased cost of materials and of very much more satisfactory industrial conditions all over the country, movements for a better margin for manufacturers almost invariably meet with successful resistance. Trade must be dull somewhere else, for the mills here are continually encountering cuts for the business they are supplying. This, too, when the volume of their orders would lead to the conclusion that there is demand enough all over the country to give everybody plenty to do at satisfactory prices.

Miscellaneous.—With the small manufacturers and shops and foundries business is about as good as it could be while competition is so sharp everywhere. It is an unlucky time for the shut-down of the Linn Foundry, which continues, the management declining proposals of arbitration and standing upon their absolute right to select their labor. The arbitration move comes from the Knights of Labor, but they have not yet done anything else publicly in the line of espousal of the molders' cause. The fortunate feature of the trouble is that the works are engaged mainly upon furnace materials for their owners, the Pratt Coal and Iron Company, and delay to these will only prevent as early a beginning as has been contemplated on their furnace. Another foundry has an order from Philadelphia for some 3 tons of small Castings to be delivered at New York, and has booked, several weeks ahead of its capacity, a large lot of Washers, most of which are for railroad construction in the West. A great deal of work is coming in from local sources, too, especially for mines and railroad grading and street railroad extensions and improvements. The Stove works recently planted here by half-a-dozen Pennsylvanians are doing well in a modest way. The Chain works, which Birmingham also owes to Pennsylvania enterprise, continue to get all the orders they can well fill.

Coal.—The Pratt Coal and Iron Company have commenced the delivery of Steaming Coal to the Louisville and Nashville Railroad

under a 20,000-ton contract. This is about an average transaction for summer delivery between the largest producer and the largest consumer of this character of fuel in this part of the country. Other operators in the same line report fair demand. Several of the leading Domestic Coal concerns are still kept out of the market by delays of necessary new machinery, and the trade, consequently, has hardly taken definite shape yet.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, July 26, 1886.

There is nothing to indicate any change in the general market, and matters are moving along about in the same manner that they have been for the past few weeks. As the season advances the weather becomes more favorable for the growing crops, which are now coming forward with better prospects. The manufacturers report a good run of orders, and that the prospects are good for a full run during the remainder of the year. In making up their usual semi-yearly business some of them found themselves in a condition to declare dividends, which was done in amounts ranging from 5% to 40% on their capital stock for the first six months' business of the year. The Lumber business still continues good, and prices are remaining firm. The question of a number of new railroads is being discussed, and the probability is that some of them will be built in the early future, as there are many locations and important points which could be covered by lines that would be paying investments.

Pig Iron.—Is still moving away from the furnaces about as fast as it is made; there are no stocks accumulating that are worthy of being classed as desirable grades. The truth is that prices are gradually stiffening up, although there are a great many people who deny it; some large round lots have been sold at prices at least 50¢ per ton higher than they could have been placed two months ago. There seems to be a disposition on the part of buyers, mostly consumers, to make their contracts now for what they will require for consumption for the next six or eight months. When large lots are sold, as they have been during the past week at prices for No. 1 of \$14.50 @ \$14.90, net at the furnace, it is a very good indication of the state of the markets. The Southern foundries are taking their usual supply, but as a general thing they prefer to buy in small lots, ranging from carload to 100-ton lots. The Southern foundries are well supplied with orders, the character of their work being mostly machinery and repairs for the numerous manufacturers that are located in their vicinity; hence their demand for Pig Iron is generally quite regular.

Miscellaneous.—The Wrought-Pipe works located in this city are getting their machinery as fast as is practicable. They expect to be in operation early in the coming year. The Roan Iron Company are also pressing the work in remodeling the Old Rail mill into their new Steel plant, but it will probably be the beginning of the next year before they can commence blowing.

Cincinnati.

JULY 26, 1886.

Pig Iron.—Dealers report no new features in the market further than that new inquiries from consumers for both immediate and future supply are met by prompt quotations and at prices that seem to be but little concession on former quotations, and for deliveries through this year, in some cases for deliveries extending into 1887. The general feeling in this great distributing center is that the demand for consumption at all points in the United States and Canada will absorb the output of the furnaces in the West and South, and that present prices will obtain for all grades and for every use. Quotations for the past week, f.o.b. here or less freight to Cincinnati when orders are filled direct from furnaces:

Charcoal Foundry.	
Hanging Rock, Best, No. 1, 4 mos.	\$21.00 @
Hanging Rock, Good, No. 1, 4 mos.	20.00 @
Hanging Rock, Good, No. 2, 4 mos.	18.00 @
Southern No. 1, 4 mos.	17.50 @
Southern No. 2, 4 mos.	16.50 @
Coke Foundry.	
Ohio and West Pennsylvania, No. 1, 4 mos.	18.00 @
Ohio and West Pennsylvania, No. 2, 4 mos.	17.00 @
Southern—Virginia, Tennessee, Alabama and Georgia, No. 1, 4 mos.	16.00 @
Southern—Virginia, Tennessee, Alabama and Georgia, No. 2, 4 mos.	15.00 @
Close Foundry and Mill grades	14.00 @
Car-Wheel.	
Southern Warm-Blast Char'l, cash	17.00 @
Southern Standard Warm-Blast Charcoal, 4 mos.	22.00 @
Hanging Rock, Warm-Blast Charcoal, 4 mos.	19.00 @
Hanging Rock, Cold-Blast Charcoal, 4 mos.	24.00 @
Maryland and Virginia	27.00 @
Forge.	
Southern Coke, Neutral, cash	14.00 @
Southern Coke, Cold-Short, 4 mos.	13.50 @
Southern Coke, low grades, cash	15.00 @
Scrap.	
Rails	20.00 @
Wheels	16.50 @
Wrought, for range of grades, ½	100 lb.
Cast, for range of grades, ½ 100 lb.	50 @
Customary discount, 40¢ @ 50¢ per ton for cash from time prices.	

Louisville.

W. B. BELKnap & Co., Louisville, write as follows, under date of July 26: The business of the past week has been good in volume, though marked by no special rush

in any one line of goods. Various assorted orders of moderate dimensions seem to be the rule.

Nails.—Are moving freely and we have heard of some good sized speculative orders being placed. Stocks are understood to be light, and when wanted immediate shipment is always urged.

Wire.—Barb Wire is in greater demand. The price, though, seems to be off, and bargains are as thick as stackers on the hog variety. Plain Wire is quiet and demand slow.

Iron.—Stove-Pipe Iron is inquired for and a few orders placed, but there is no lively interest in the market manifested by the moderate buyer, at least.

In many lines ordinarily saleable there is an apathy from the unwillingness of the merchant to take hold lest his trade should increase their already too heavy accounts. Until some of the indebtedness is paid off we do not look for lively times. The good crops hereabout will go a long way toward this end, but in the South and many hitherto prosperous sections we learn that the cotton is a complete failure.

St. Louis.

ROGERS, BROWN & Co., St. Louis, W. H. SHIELDS, manager, report, under date of July 26: A slow but steadily stiffening market has characterized the week in Pig Iron. Buying has been more active than at any time since last December. Furnace order-books are filling up rapidly, and a disposition is noted to advance figures a little with each new sale. The demand has come mainly from stove and car works, agricultural concerns and jobbing foundries. The feeling seems to be general that a good fall business is ahead, and that while railroad construction continues at the present rate prices will certainly be no lower. We quote for cash:

Charcoal Foundry.	
Missouri—None offering, nominally	\$16.00 @ \$17.00
Southern	17.00 @ 18.00
Coke and Coke Foundry.	
Southern, No. 1	16.75 @ 17.25
Southern, No. 2	16.25 @ 16.75
Ohio Softeners	17.00 @ 20.00
Mill Iron.	
Missouri	16.00 @ 16.50
Southern	14.25 @ 15.75
Car-Wheel and Malleable Irons.	
Southern	20.00 @ 25.00
Lake Superior	21.00 @ 23.00
Scrap, etc.	
Old Wheels	15.75 @ 16.25
Connellsville Coke (Frick's)	5.65

Detroit.

CHARLES HIMROD & Co., dealers in Pig Iron, Detroit, Mich., report, under date of July 26, as follows: At no time during the present year, not excepting the large selling that occurred in January, has there been such a demand and such large purchasing of all grades of Metal as during the past week. These purchases consist of Metal both coming here and going from this market, and without doubt the tonnage balance is much in favor of Michigan production. The purchases by Harvesting Machinery men being made so far in advance this year of their usual custom have created quite a stir in the Lake Superior Charcoal-Iron market. Some of these men have not yet completed their purchases, and it is a query among producers where all of the stock is coming from. Looking at statistics, they show that a large quantity of Charcoal Iron is in producers' hands, but it is a fact that should not be overlooked that the largest quantity of this stock might be called outside Iron, inasmuch as the furnaces holding the same have been doing so for some time past and are continuing to pile up their stocks, banking on the future. Keeping this fact in view, unless these people turn in and sell at this time it does not seem possible that the market can fail to advance. Already there is a lack of eagerness on the part of sellers, which causes present and prospective buyers some anxiety to close for what they require as quickly as possible. Southern Iron is low and irregular in price, and many contracts are sought for for a year's time, even at present prices. There can be no doubt now that the Lake Superior Charcoal men will lead in the advance when it shall take place. We should think the market fairly quotable to-day as follows:

Lake Superior Charcoal, all numbers	\$21.50 @ \$22.50
Lake Superior Coke, All Ore	20.00 @ 21.00
Lake Superior Coke, Cinder Mixed	18.00 @ 19.00
Standard Ohio Blackband	20.00 @ 21.00
Southern No. 2	17.00 @ 17.50
Southern Silvery, Open	17.00 @ 17.50
Southern Silvery, Close	16.50 @ 17.00
Jackson County, Ohio Silvery	18.00 @ 19.00
American Old Iron Rails	20.00 @ 21.00
Old Wheels	16.50 @ 17.50

Coal Market.

The two events of the last few days in the Anthracite Coal trade is the allotment for August as arranged about a week ago, and the announcement of an advance in prices of 15¢ @ 20¢ per ton as agreed upon on Thursday last at a meeting of the Coal trade managers in this city. The proposed advance was fully discussed, and a resolution was passed without dissent fixing the price of Stove at \$3.50 per ton in New York harbor, f.o.b., and Grate, Egg and Chestnut at \$3.15, to take effect immediately. From these prices a commission of 15¢ a ton will be given to contractors or wholesale dealers. The Pennsylvania Railroad Company was not represented, leaving it to be inferred that the position of this heavy producer is somewhat equivocal. As to the effect of the advance, little is expected to transpire before August, although some of the wholesale agents represent that there is a more conscientious regard for the circular and a general stiffening up. According to others, "dealers don't bite." It is admitted, however, by all hands that business is "quiet as Sunday." The Reading, Lehigh and some others, having filled their quota for the month, have

stopped mining until August 1, and it is believed that the allotment of 2,500,000 tons for the coming month will be literally adhered to. At the same time it is to be borne in mind that mining and transporting companies have two sources of profit, so that there may be a pecuniary inducement to produce Coal even if sold at a loss.

New York harbor boatmen have organized to control prices for transportation, and it is said that they will make an advance August 1. Coastwise vessels are moving out more freely to Eastern ports, both from New York and Philadelphia.

The total amount of Anthracite mined thus far in the year 1886 is 15,931,879 tons, compared with 14,447,132 tons for the same period last year, an increase of 1,484,747 tons. The shipments from the mines of the Cumberland Coal region for the week were 73,516 tons, and for the year to date 961,031 tons, a decrease of 478,773 tons as compared with the corresponding period of 1885.

Bituminous is very quiet at \$3.15 @ \$3.25

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending July 28, 1886:

Hardware.	
Baker Hermann & Co.	Crossmond L. D. & Co.
Cutlery, cs, 14	Cast iron, pce., 1
Arms, cs, 9	Pain H.
Dieckhoff, Radloer & Co.	Tubes, 12
Case, 1	Perkins C. L.
Dolge Alfred	Spiegel, tons, 400
Mdse., cs, 3	Rail ends, 408
Downing R. F. & Co.	Ferronmanganese, tons, 428½
Cases, 7	Stetson Geo. W. & Co.
Drexel, Morgan & Co.	Pig, tons, 400
Arms, cs, 8	Williamson Jas. & Co.
Field Alfred & Co.	Pig, tons, 300
Mdse., cs, 22	Order.
Folsom H. & D.	Pig, tons, 550
Arms, cs, 17	Ore, tons, 750
Godfrey J.	Silico spiegel, tons, 29
Arms, cs, 4	Rods, bdls., 2631
Gervan Otto	Castings, case, 1
Bundles, 216	Wire rods, bdls., 54
Bales, 12	Pig, lot, 1
Graef Cutlery Co.	Crop ends, tons, 3004
Chains, &c., pkgs., 13	Spiegel, tons, 210
Mdse., cs, 31	Spiegel, kg., 254,000
Hartley & Graham	
Mdse., cs, 8	Steel.
Henscheimer L.	Abbott Jere & Co.
Mdse., parts, pkgs., 13	Billets, 245
Hemely H. A.	Baring Bros. & Co.
Old mach'y, case, 1	Rods, bdls., 3844
Hoe R. & Co.	Downing R. F. & Co.
Mdse., cs, 2	Slabs, 560
James Emil	Cary & Moen
Sew. machs., pkgs., 37	Casks, 12
Kastor A.	Heyn Alf.
Cutlery, cs, 3	Rods, pkgs., 213
Lalanc & Grosjean	Flock & Co.
Mfg. Co.	Flat steel, pkgs., 3329
Cases, 2	Power C. W.
McCoy & Sanders	Cases, 12
Chains, &c., pkgs., 8	Wagner W. F.
Mer. Disp. Co.	Packages, 184
Cutlery, cs, 3	Order.
Rottenberg S. S. Co.	Sheets, cs, 4
Arms, cs, 31	Billets, 561
Sala, Hohob & Co.	Forgings, 12
Mach'y, box, 1	Bands, 30
Schoverling, Daly & Gales	
Mdse., cs, 46	Metals.
Shulte Wm. & Co.	Alexandre F. & Sons
Cases, 12	Quicksilver, flasks, 850
Sheldon Geo. W. & Co.	Bruce & Cook
Cases, 11	Tin plates, bxs., 531
Singer Sewing Machine Co.	Black pits, bxs., 159
Machines, cs, 34	Bloomfield J. C. & Co.
Machines, parts, cs, 34	Copper rollers, cs, 3
Strauss, Blumenthal & Co.	Central Stamping Co.
Cases, 8	Tin plates, bxs., 1422
Mosher, Wheeland & Co.	DeMilt H. R. & Co.
Case, 1	Tin plates, bxs., 545
Wittebroe Bros.	Drexel & Co.
Machines, parts, cs, 25	Tin plates, bxs., 414
Witte John G. & Bro.	Erie & G. W. Disp.
Needles, case, 1	Tin plates, bxs., 1585
Cutlery, cs, 11	Frazier J. A.
Guns, cs, 3	Type metal, ingots, 2100
Order.	Merrick C. B. & Co.
Mach'y, cs, 72	Tin plates, bxs., 150
Mach'y, crates, 5	Montell F. L. & Son
Guns, cs, 4	Old brass, pkgs., 5
Files, csks., 4	Old metal, bbls., 3
Packages, 12	Paulsen W.
Iron.	Tin plates, bxs., 6
Baring Bros. & Co.	Phelps, Dodge & Co.
Rods, bdls., 2739	Tin plates, bxs., 16,019
Wire rods, coils, 1033	Black taggers, bxs., 60
Bars, 7966	Pierson C. L.
Ore, kg., 350,000	Sheathing, cs, 40
Crocker Bros.	Order.
Pig, tons, 207	Tin pits, bxs., 30,964
Ferro Iron, tons, 285	Zinc oxide, bbls., 100
	Tin, ingots, 701
	Plumbago, bbls., 92

The imports of Cutlery, Hardware and Metals at this port, during the week ending July 23, were as follows:

	Quantity.	Value.
Arms	155	\$1,013
Brass goods	25	2,704
Bronzes	30	2,096
Chain and anchors	50	2,808
Clocks	48	3,569
Copper	12	506
Cutlery	152	37,208
Dutch metal	16	2,071
Electrotypes	13	362
Guns	150	18,985
Hardware	9	1,900
Iron, pig, tons	2,063	22,214
Iron, sheet, tons	24	1,490
Iron, spiegel, tons	1,883	22,519
Iron, tubes	106	700
Iron, other, bbls.	1,053	25,016
Lead, pigs	1,570	6,264
Machinery	229	15,873
Metal goods	413	27,604
Needles	21	4,720
Nickel	12	4,842
Old metal	12	8,048
Patina	2	13,143
Plated ware	27	1,314
Permutation caps	19	1,273
Plumbago	80	18
Saddlery	10	910
Steel	68,098	76,179
Tin, bxs.	45,537	174,299
Tin, 2128 slabs	191,745	42,270
Wire	205	2,687

At one of the last meetings of the Society of German Engineers, in Stettin, attention was drawn to the centennial jubilee of the starting of the first steam engine in the Mansfelder Gewerkschaft, the 25th of August, 1785. It is said that even before this an engine had been running in Dassel, and in 1736 one in Saarbrücken. The Mansfelder engine, however, we understand, was the first ever built in Germany by German workmen, of German material, and without any foreign assistance. The building of this engine is said to have taken several years.

Trade Report.

General Hardware.

There is absolutely no change since our last in the general situation, except that another week has gone by and the time of general activity is so much nearer. Travelers are resuming their labors, and the season's work will soon be fairly begun.

The New York Nail market is dull and quiet; many buyers have pretty well covered their requirements for the near future at low prices, while others are holding off awaiting developments. Manufacturers' agents maintain a firm attitude, and we hear of only occasional cutting by second hands, without that being any feature of importance in the market. We quote \$2.10 for carload lots and \$2.20 from store, with an advance of 10 to 15 cents for Steel Nails.

The failure of the Bridgewater Iron Company, a very old Nail manufacturing concern, was announced last week. The Boston Herald says: "It is fully believed that, if assured a sufficient time, the company will be enabled to liquidate its indebtedness in full, and leave its plant at Bridgewater intact, upon which to found a new company."

The Cobb's Iron and Nail Company, Aurora, Ind., under date of the 21st, quote Square Cut Iron Nails or Wheeling cut \$1.85, f.o.b. Aurora.

As we write a meeting of the Screw manufacturer is in session, but no reports of their action have reached us.

The prices in the circular of Merchant & Co., which we printed last week, were erroneous on Sheathing Copper, and the following correction has been issued:

Sheeting Copper.—14 x 48.	Hot Rolled.	Cold Rolled.
16 oz. to sq. ft. and heavier, per lb.	\$0.17	\$0.18
14 oz. and up to 16 oz., per lb.	.18	.19
12 oz. and up to 14 oz., per lb.	.19	.20
Tinning, 6 cents each.		

The Alford & Berkele Company, having been re-appointed agents for the Shot Gun Shells made by the American Buckle and Cartridge Company, quote the following prices. They say: "These goods, having been much improved in quality, are equal to any in the market, and we offer them at lower than the combination prices."

Paper Shells.	Per 1000.
Best Quality Waterproof Paper Shells, Diamond Grade.	
No. 10, 2 1/2 and 3 1/2 inches only.	\$12.00
No. 12, 2 1/2 inches only.	11.00
Discount 50¢ 10¢ 50¢ 2¢ 5¢.	
Second Quality Waterproof White Paper Shot Shells.	
No. 10, 2 1/2 and 3 1/2 inches only.	\$9.00
No. 12, 2 1/2 inches only.	8.00
Discount 40¢ 50¢ 50¢ 2¢ 5¢.	
Second Quality White Paper Shot Shells, Regular.	
No. 10, 2 1/2 and 3 1/2 inches only.	\$9.00
No. 12, 2 1/2 inches only.	8.00
Discount 40¢ 50¢ 50¢ 2¢ 5¢.	
Brass Shells.	
Best Quality Brass Shells, First Quality.	
No. 10, 2 1/2 and 3 1/2 inches.	\$10.00
No. 12, 2 1/2 inches.	10.00
Discount 50¢ 10¢ 50¢ 2¢ 5¢.	
Brass Shot Shells, X Quality.	
No. 10, 2 1/2 and 3 1/2 inches.	\$8.00
No. 12, 2 1/2 inches.	8.00
Discount 50¢ 10¢ 50¢ 2¢ 5¢.	

The manufacturers of Wrought-Iron Pipe held a meeting in Pittsburgh last week, but adjourned without making public any changes in prices. At the close a member said to the reporter of a local paper: "We had a discussion on trade, and found that the demand is in excess of the supply. It is with considerable difficulty that a sufficient quantity is obtained for filling pressing orders. The volume of business is greater than at this time last year, owing to the large number of natural-gas mains being put down. There was no advance made in prices, but some slight alterations were found necessary."

Changes in the price of Rope have been very frequent during the past few weeks. Two have occurred since our last. On the 21st Sisal advanced 1/2 cent per pound, making 1 1/4-inch and upward 10 cents per pound. On the 23d inst. Manila advanced 1/2 cent per pound, making 1 1/4-inch and upward 13 cents per pound, and on the 27th Sisal advanced another 1/2 cent, making 1 1/4-inch and upward 10 1/2 cents per pound. The following are the present rates, subject to the usual trade allowance:

Manila Cordage.		Cts. per lb.
1-inch cir. and upward, and Hay Rope.	13	
1 1/4-inch thread, or 5/8-inch diameter.	13 1/2	
1 1/2-inch thread, or 3/4 and 5-16 diameter.	14	
1 3/4-inch thread, or 7/8 and 1/4 diameter.	15	
2-inch thread, or 1 and 1/4 diameter.	16	
2 1/4-inch thread, or 1 1/4 and 1/2 diameter.	17 1/2	
2 1/2-inch thread, or 1 1/2 and 5/8 diameter.	18 1/2	
2 3/4-inch thread, or 1 3/4 and 3/4 diameter.	19 1/2	
3-inch thread, or 1 3/4 and 7/8 diameter.	20 1/2	
3 1/4-inch thread, or 1 3/4 and 1/2 diameter.	21 1/2	
3 1/2-inch thread, or 1 3/4 and 1/2 diameter.	22 1/2	
3 3/4-inch thread, or 1 3/4 and 1/2 diameter.	23 1/2	
4-inch thread, or 1 3/4 and 1/2 diameter.	24 1/2	
4 1/4-inch thread, or 1 3/4 and 1/2 diameter.	25 1/2	
4 1/2-inch thread, or 1 3/4 and 1/2 diameter.	26 1/2	
4 3/4-inch thread, or 1 3/4 and 1/2 diameter.	27 1/2	
5-inch thread, or 1 3/4 and 1/2 diameter.	28 1/2	
5 1/4-inch thread, or 1 3/4 and 1/2 diameter.	29 1/2	
5 1/2-inch thread, or 1 3/4 and 1/2 diameter.	30 1/2	
5 3/4-inch thread, or 1 3/4 and 1/2 diameter.	31 1/2	
6-inch thread, or 1 3/4 and 1/2 diameter.	32 1/2	
6 1/4-inch thread, or 1 3/4 and 1/2 diameter.	33 1/2	
6 1/2-inch thread, or 1 3/4 and 1/2 diameter.	34 1/2	
6 3/4-inch thread, or 1 3/4 and 1/2 diameter.	35 1/2	
7-inch thread, or 1 3/4 and 1/2 diameter.	36 1/2	
7 1/4-inch thread, or 1 3/4 and 1/2 diameter.	37 1/2	
7 1/2-inch thread, or 1 3/4 and 1/2 diameter.	38 1/2	
7 3/4-inch thread, or 1 3/4 and 1/2 diameter.	39 1/2	
8-inch thread, or 1 3/4 and 1/2 diameter.	40 1/2	
8 1/4-inch thread, or 1 3/4 and 1/2 diameter.	41 1/2	
8 1/2-inch thread, or 1 3/4 and 1/2 diameter.	42 1/2	
8 3/4-inch thread, or 1 3/4 and 1/2 diameter.	43 1/2	
9-inch thread, or 1 3/4 and 1/2 diameter.	44 1/2	
9 1/4-inch thread, or 1 3/4 and 1/2 diameter.	45 1/2	
9 1/2-inch thread, or 1 3/4 and 1/2 diameter.	46 1/2	
9 3/4-inch thread, or 1 3/4 and 1/2 diameter.	47 1/2	
10-inch thread, or 1 3/4 and 1/2 diameter.	48 1/2	
10 1/4-inch thread, or 1 3/4 and 1/2 diameter.	49 1/2	
10 1/2-inch thread, or 1 3/4 and 1/2 diameter.	50 1/2	
10 3/4-inch thread, or 1 3/4 and 1/2 diameter.	51 1/2	
11-inch thread, or 1 3/4 and 1/2 diameter.	52 1/2	
11 1/4-inch thread, or 1 3/4 and 1/2 diameter.	53 1/2	
11 1/2-inch thread, or 1 3/4 and 1/2 diameter.	54 1/2	
11 3/4-inch thread, or 1 3/4 and 1/2 diameter.	55 1/2	
12-inch thread, or 1 3/4 and 1/2 diameter.	56 1/2	
12 1/4-inch thread, or 1 3/4 and 1/2 diameter.	57 1/2	
12 1/2-inch thread, or 1 3/4 and 1/2 diameter.	58 1/2	
12 3/4-inch thread, or 1 3/4 and 1/2 diameter.	59 1/2	
13-inch thread, or 1 3/4 and 1/2 diameter.	60 1/2	
13 1/4-inch thread, or 1 3/4 and 1/2 diameter.	61 1/2	
13 1/2-inch thread, or 1 3/4 and 1/2 diameter.	62 1/2	
13 3/4-inch thread, or 1 3/4 and 1/2 diameter.	63 1/2	
14-inch thread, or 1 3/4 and 1/2 diameter.	64 1/2	
14 1/4-inch thread, or 1 3/4 and 1/2 diameter.	65 1/2	
14 1/2-inch thread, or 1 3/4 and 1/2 diameter.	66 1/2	
14 3/4-inch thread, or 1 3/4 and 1/2 diameter.	67 1/2	
15-inch thread, or 1 3/4 and 1/2 diameter.	68 1/2	
15 1/4-inch thread, or 1 3/4 and 1/2 diameter.	69 1/2	
15 1/2-inch thread, or 1 3/4 and 1/2 diameter.	70 1/2	
15 3/4-inch thread, or 1 3/4 and 1/2 diameter.	71 1/2	
16-inch thread, or 1 3/4 and 1/2 diameter.	72 1/2	
16 1/4-inch thread, or 1 3/4 and 1/2 diameter.	73 1/2	
16 1/2-inch thread, or 1 3/4 and 1/2 diameter.	74 1/2	
16 3/4-inch thread, or 1 3/4 and 1/2 diameter.	75 1/2	
17-inch thread, or 1 3/4 and 1/2 diameter.	76 1/2	
17 1/4-inch thread, or 1 3/4 and 1/2 diameter.	77 1/2	
17 1/2-inch thread, or 1 3/4 and 1/2 diameter.	78 1/2	
17 3/4-inch thread, or 1 3/4 and 1/2 diameter.	79 1/2	
18-inch thread, or 1 3/4 and 1/2 diameter.	80 1/2	
18 1/4-inch thread, or 1 3/4 and 1/2 diameter.	81 1/2	
18 1/2-inch thread, or 1 3/4 and 1/2 diameter.	82 1/2	
18 3/4-inch thread, or 1 3/4 and 1/2 diameter.	83 1/2	
19-inch thread, or 1 3/4 and 1/2 diameter.	84 1/2	
19 1/4-inch thread, or 1 3/4 and 1/2 diameter.	85 1/2	
19 1/2-inch thread, or 1 3/4 and 1/2 diameter.	86 1/2	
19 3/4-inch thread, or 1 3/4 and 1/2 diameter.	87 1/2	
20-inch thread, or 1 3/4 and 1/2 diameter.	88 1/2	
20 1/4-inch thread, or 1 3/4 and 1/2 diameter.	89 1/2	
20 1/2-inch thread, or 1 3/4 and 1/2 diameter.	90 1/2	
20 3/4-inch thread, or 1 3/4 and 1/2 diameter.	91 1/2	
21-inch thread, or 1 3/4 and 1/2 diameter.	92 1/2	
21 1/4-inch thread, or 1 3/4 and 1/2 diameter.	93 1/2	
21 1/2-inch thread, or 1 3/4 and 1/2 diameter.	94 1/2	
21 3/4-inch thread, or 1 3/4 and 1/2 diameter.	95 1/2	
22-inch thread, or 1 3/4 and 1/2 diameter.	96 1/2	
22 1/4-inch thread, or 1 3/4 and 1/2 diameter.	97 1/2	
22 1/2-inch thread, or 1 3/4 and 1/2 diameter.	98 1/2	
22 3/4-inch thread, or 1 3/4 and 1/2 diameter.	99 1/2	
23-inch thread, or 1 3/4 and 1/2 diameter.	100 1/2	
23 1/4-inch thread, or 1 3/4 and 1/2 diameter.	101 1/2	
23 1/2-inch thread, or 1 3/4 and 1/2 diameter.	102 1/2	
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61-inch thread, or 1 3/4 and 1/2 diameter.	252 1/2	
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62-inch thread, or 1 3/4 and 1/2 diameter.	256 1/2	
62 1/4-inch thread, or 1 3/4 and 1/2		

time ago. Under each tier of shelving there are two double doors, and 2 feet 8 inches high, 2 feet deep and 4 feet long, where I keep all surplus stock. Some of these tools have one and others two shelves, as necessary for the kind of stock contained in them. Through the center of store there are two platforms for Stoves, also a platform for Stoves the whole length on left side. Above this platform there is movable shelving, the bottom of which is 3 feet 6 inches above the platform. In this way we can show from 50 to 60 Stoves. I have double front windows, and like them very much. It will be observed that the doors are not in the center of the store, and it might be thought that the front would not look as well, but it does, and I had them so placed as a matter of convenience. The building is of stone with narrow match pine, and only varnished, which makes it look almost like rich cherry. The balance of the woodwork is of ash and chestnut.

Further details of the arrangement are given below, reference being made to the accompanying diagrams, Figs. 110 and 111.

The right-hand window on entering store I always trim with Hardware of some kind, but hardly ever twice alike. At present the wall side is covered with red flannel, and on this at top I have samples of Files, Raps, &c., arranged somewhat like cut in Sargent & Co.'s book, page 705. Under the Files are samples of Stocks and Dies, and under these samples of Squares, Wrenches, &c. In center of window we have a hexagon pyramid very much like the patent Screw cases, and which can be turned

is a 10-foot show case for Silver and Plated Ware, such as Knives, Forks, Spoons and small pieces. On first end of next counter is a case 4½ feet long, 3½ feet high and 2½ feet wide for Table Casters and large pieces of Plated Ware. Under this counter are my Nail Bins from 3d. Fine to 60d. We take Nails out from back side, but they are open in front, so that any one can see the size wanted. On first end of last counter is a patent Shot case, marked A, that holds eight sizes of Shot, 25 pounds of each size. By simply turning a lever you can get just 1 pound of Shot, and there is no chance to waste any. A 25-pound sack will turn out 25 pounds every time. Next comes a patent Screw case, marked B, holding 72 gross. The further end of counter is used for Axes, &c. Under the first end are bins for Wrought and Casted Nails. Then come bins for Horse Shoes, 12 in all, each 8 inches wide, that will easily hold a keg of Shoes if packed in. Over each bin of Shoes, just under counter top, is a drawer 6 inches deep in which we keep Horse Nails, Carpet Tacks in bulk and Wire Finishing Nails. On front of counter are brackets to hold two tiers of Floor Oil Cloth. At the left of entrance to office are holes through floor for all sizes of Rope from ¼ to 1½ inches. The Rope is kept in basement, and the ends running up through floor are fastened to hooks in wall. Thus we have the run way to measure the Rope off. At the left as you enter store is a counter or rather table on which are two show cases 6 feet each. In the first we keep Pocket Cutlery. We have boxes made on purpose, all of same size and just alike. The case holds 105 of these boxes, and on

have been secured in that way, the fluctuations in London simultaneously being unusually small, namely, between £97. 17/6 and £98. 12/6 for spot, futures being held £1 7/8 ton over spot prices. Some business has also been done here for August at 21.90¢, and September at 22¢ @ 22.05¢. Spot Tin is obtainable at 22¢, and may be shaded. To-morrow the bi-monthly Banca sale will come off at Amsterdam, and the attention of the trade here and in Europe is now being drawn to that event, which may be the starting point of either a further advance or decline. Meanwhile consumption is everywhere fully kept up. About the Australian supply Messrs. Vivian, Younger & Fond, London, say: "Recent advices from Australia confirm all that has been said as to lessened production. Though the late fluctuations have produced some feeling of distrust in the article, there is no getting over the fact that consumption has run ahead of production for the time being, and there is little prospect for some months to come of the position being reversed, even though prices should rise quickly." Whether the gold excitement about the mines in Northwestern Australia will cause a rush from the Tin mines to the new gold placers remains to be seen; were this the case the supply thence would dwindle down still further. The shipments from the Straits Settlements to the United States first five months have been 26,067 piculs, against 16,

est obstacles in the way of its universal use, but the spirit of invention of the Chinese has overcome it, and for two years past innumerable lamps are manufactured at Canton so constructed as to best answer its purpose in China, and thence they are shipped to the provinces where petroleum is burned, the primitive lamp thus being superseded, in which a vegetable oil was burned, which, while giving a dim light, involved an expense of oil three times as great as petroleum. In order to properly appreciate the importance of the more general adoption of petroleum in China it should be taken into account, 1, that so far as known China is devoid of petroliferous regions; 2, that the population is 400,000,000; 3, that, spreading from the great rivers, there is a network of canalization throughout the Empire facilitating cheap transportation. The Yangtze River, for example, is at present navigated by foreign steamers a distance of 1000 miles from its mouth, and navigation is now to be pushed on it 250 miles beyond, so as to reach the great city of Chung King, the distributive center of the rich Province of Szechuen. The Yangtze River, with its tributaries, flows through some of the richest provinces of China. For the present the petroleum demand is filled almost exclusively from Hongkong and Shanghai, the latter reshipping to all ports north of Foochow, and Hongkong to ports along the southern coast. Shanghai is the most important port; Hongkong furnishes, aside from its coastwise shipments, the city of Canton—with its 1,600,000 inhabitants—the petroleum it consumes, and furthermore the Province of Kwangtung. Mr. Dunlop's statistics of petroleum import into China do not include Hongkong. At the treaty ports they were as under:

	1875.	1883.	1884.	1885.
Shanghai.	1,279,880	6,119,005	6,890,060	14,354,202
Ningpo.	98,020	819,400	1,144,000	1,185,510
Chia Kiang.	14,390	384,080	830,000	1,222,910
Wuhu.	206,940	380,000	608,800	608,800
Chiao.	134,740	271,480	507,280	507,280
Hankow.	29,410	1,322,771	2,739,910	4,148,440
Tientsin.	23,650	398,940	394,250	725,510
Cherof.	9,880	17,000	27,372	48,710
Wenchow.	19,980	69,000	69,000	67,420
Foochow.	6,580	235,960	34,292	65,065
Fakhoi.	17,000	91,110	60,700	60,700
Tamsin.	6,008	34,900	131,430	131,430
Takow.	7,680	35,598	78,490	78,490
Anoy.	4,300	23,582	68,470	68,470
Swatow.	51,747	79,002	79,002	79,002
Klung Chow.	9,880	22,080	22,080	22,080

Total, 1,476,785 9,876,209 13,173,876 23,112,943
Canton is omitted, as it draws its supply from Hongkong. The fluctuations in the import of some of the above ports were brought about by the Franco-Chinese war, which caused local restriction while it lasted.

As the population of Hongkong and the treaty ports taken together does not quite aggregate 6,000,000, it is interesting to note what amounts were reshipped into the interior from six of the leading treaty ports:

	1882.	1883.	1884.	1885.
From Galls.	30,350	744,740	2,056,640	3,189,230
Shanghai.	30,350	744,740	2,056,640	3,189,230
Ningpo.	217,750	230,800	289,030	351,310
Chia Kiang.	111,520	135,991	511,770	757,362
Wuhu.	16,730	39,080	146,900	265,470
Chiao.	4,300	23,582	68,470	267,330
Chiao.	118,370	259,677	1,048,830	1,827,810

Total, 772,080 1,508,640 4,147,070 6,678,702
In order to cast some further light upon the subject, so far as the figures are at our disposal, we shall add to Mr. Dunlop's Chinese import statistics the tables showing the export from New York to China, Japan and other Eastern countries:

Export of Refined Petroleum from New York to Certain Foreign Ports, from Jan. 1 to Dec. 31.

	1885.	1884.	1883.
China and Japan.	18,772,700	18,772,700	18,772,700
Shanghai.	18,772,700	18,772,700	18,772,700
Hongkong.	8,159,050	8,159,050	8,159,050
Yokohama.	10,897,380	10,897,380	10,897,380
Saigon.	1,007,310	1,007,310	1,007,310
Tientsin.	528,000	528,000	528,000
Nagasaki.	90,000	90,000	90,000
Higo.	760,370	760,370	760,370

Total, 40,960,410 27,396,720 25,184,470
India and Siam.

	1885.	1884.	1883.
Bombay.	9,744,400	9,744,400	9,744,400
Calcutta.	12,805,650	12,805,650	12,805,650
Pointe de Galle.	1,150,400	1,150,400	1,150,400
Colombo.	1,150,400	1,150,400	1,150,400
Batavia.	804,130	804,130	804,130
Kurrachee.	804,130	804,130	804,130
Madras.	473,820	473,820	473,820

Total, 25,941,030 28,089,200 16,838,090
East Indies.

	1885.	1884.	1883.
Anjer.	7,905,170	7,905,170	7,905,170
Batavia.	7,905,170	7,905,170	7,905,170
Manila.	1,282,410	1,282,410	1,282,410
Penang.	1,282,410	1,282,410	1,282,410
Rangoon.	2,539,070	2,539,070	2,539,070
Singapore.	2,539,070	2,539,070	2,539,070
Banjerma.	200,000	200,000	200,000
Macassar.	200,000	200,000	200,000
Banda.	50,800	50,800	50,800

Total, 22,681,730 28,762,330 31,495,150
Australia.

	1885.	1884.	1883.
Australia.	4,722,320	4,722,320	4,722,320
New Zealand.	1,000,540	1,000,540	1,000,540

Total, 56,610,690 64,440,527 74,375,430
According to these tables there were shipped from New York alone in 1885:

	Galls.
To China.	18,772,700
Shanghai.	18,772,700
Hongkong.	8,159,050
Tientsin.	238,000
Total.	35,909,350
To Japan.	10,897,380
Yokohama.	10,897,380
Higo.	760,370
To Coochin China.	1,007,310
British India.	30,820,130
To Siam, Bangkok.	804,130
To Netherland and Spanish India.	16,992,500
To Australasia.	6,421,896
Total.	65,610,690

If Japan, with a population of 36,700,118, and India, with a population of 253,891,821, furthermore Australasia, with only 3,325,140 souls, receive from New York alone the numbers of gallons of refined oil set against them in the tables above, what may not be expected in course of time in the way of petroleum consumption of a country with a population of 403,259,000! Nor can Russian petroleum become much of a rival of ours in China till the Central Asiatic Railway is in operation to the Chinese frontier, which may take all that remains of this century. In British India, it is true, Russia hopes to supersede us in this item through pipe-lines via the Gulf of Persia much sooner. But who tells us but what even there American petroleum will be preferred to Russian permanently?

The statement is made that the Illinois Central Company have decided to build a line from Chicago to Freeport, Ill., where they will connect with their Dubuque line and give a direct outlet to the roads leased and controlled by them in Northern Iowa.

Exports.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the port of New York, for the week ending July 27, 1886:

Dutch West Indies.		Quan.	Val.	Quan.		Val.
Japan ware.	2	29		Mf. iron, pkgs.	112	55
Hdw. cs.	22	114		Cutlery, cs.	2	147
Tinware, cs.	4	73		New Brunswick.		
Iron, bbls.	5	21		Pig iron, tons.	100	1,900
Mf. iron, pkgs.	2	31		Haere.		
Iron, pkgs.	5	41		Sew. ma. cs.	350	6,920
Metal, case.	1	60		Cop. ore, sks.	996	5,000
Windlass.	1	51		Copper, cks.	680	78,750
Danish West Indies.				Mach'y, pkgs.	2	347
Ag. imp. pkgs.	22	241		Pumps, pkgs.	3	125
Sew. ma. case.	1	40		Ag. imp. pkgs.	16	1,000
Nails, kegs.	15	45		Lisbon.		
Mf. iron, pkgs.	7	65		Scales, cs.	6	153
Nails, kegs.	40	135		Clocks, case.	1	12
Hamburg.				Cuba.		
Sew. ma. cs.	473	10,272		Nails, cs.	24	305
Clocks, cs.	6	207		Clocks, cs.	6	146
Mach'y, pkgs.	18	1,300		Hdw. pkgs.	68	1,040
Wringers, cs.	6	212		W. closet matl.		
Arms, cs.	2	602		Saws, case.	1	42
Valves, cs.	13	177		Sew. ma. cs.	147	5,200
Hdw. pkgs.	130	3,025		Tin, cs.	31	318
Saws, cs.	3	134		Wire cloth, case.	1	64
Ag. imp. pkgs.	4	23		Nails, kegs.	47	1,039
Mf. iron, pkgs.	8	146		Mf. iron, pkgs.	755	2,730
Lead trap, case.	1	15		Lead trans. case.	1	350
Tacks, case.	1	30		Pumps, pkgs.	5	180
Nails, case.	1	43		Ag. imp. pkgs.	20	300
Bremen.				Metal gds., cs.	8	482
Hdw. cs.	25	389		Cutlery, cs.	27	334
Mach'y, pkgs.	4	820		Tinware, cs.	17	369
S. rollers, cs.	12	217		Cartridges, cs.	12	229
Ag. imp. pkgs.	78	1,330		French West Indies.		
Copenhagen.				Tinware, cs.	3	60
Hdw. cs.	3	58		Porto Rico.		
Mf. iron, pkgs.	3	138		Mf. pkgs.	5	70
Wire, cs.	3	125		Windmill.	25	170
Antwerp.				Ag. imp. pkgs.	4	90
Arms, cs.	17	2,726		Widall.	1	30
Mach'y, pkgs.	18	2,500		Mf. iron, pkgs.	27	375
Hdw. cs.	3	198		Sew. ma. case.	1	60
Christiania.				Venice.		
Hdw. cs.	55	435		Clocks, bxs.	9	832
Rotterdam.				Japan.		
Hdw. cs.	58	602		Mf. iron, pkgs.	36	216
Mach'y, pkgs.	1	350		Hdw. cs.	3	87
Liverpool.				Clocks, cs.	60	1,100
Cutlery, cs.	5	654		Venezuela.		
Saws, cs.	95	535		Mach'y, pkgs.	16	1,260
Mach'y, pkgs.	64	4,112		Cutlery, cs.	2	16
Copper matl.				Hdw. cs.	100	1,084
Arms, cs.	11,334	101,995		Mf. iron, pkgs.	141	1,967
Pumps, pkgs.	16	1,176		Ag. imp. pkgs.	1	30
Clocks, cs.	56	1,779		Pumps, pkgs.	6	169
Mf. iron, pkgs.	1	30		Tinware, cs.	4	151
Steel, pcs.	10	25		Nails, kegs.	8	28
Hdw. pkgs.	48	1,554		Oporto.		
Ag. imp. pkgs.	72	6,099		Clocks, cs.	2	21
Sew. ma. cs.	206	4,001		Mexico.		
Brass goods, cs.	315	1,085		Per. caps, cs.	9	374
Revolvers, case.	1	137		Sew. ma. cs.	25	890
Newcastle.				Pumps, pkgs.	25	1,065
Mach'y, pkgs.	1	124		Tacks, cs.	33	395
Hull.				Ag. imp. pkgs.	14	212
Hdw. cs.	55	747		Nails, kegs.	4	8
S. rollers, cs.	30	472		Iron, case.	1	20
Mach'y, pkgs.	1	124		Tin, cs.	1	14
Clocks, cs.	7	96		Iron, pkgs.	50	67
Bristol.				S. evaporators.	4	1,060
Mach'y, pkgs.	2	147		Lead pipe, bbls.	4	30
Ag. imp. pkgs.	8	140		Mf. st. l. case.	1	37
Glasgow.				Cutlery, cs.	11	272
Ag. imp. pkgs.	3	75		Mf. iron, pkgs.	63	567
Wringers, cs.	12	144		Hdw. pkgs.	155	2,224
Ox. zinc, bbls.	100	774		Clocks, case.	1	56
Hdw. pkgs.	18	149		Tinware, cs.	7	165
Wash. mach.	2	16		Saws, case.	1	28
cs.	2	16		Cartridges, case.	1	9
Sew. ma. case.	1	687		Mach'y, pkgs.	47	3,912
Leith.				Car-wheels.	100	816
Ag. imp. pkgs.	1	47		Fig. iron, tons.	24	398
Hdw. cs.	9	207		Br. goods, cs.	1	10
Gibraltar.				St. Michaels.		
Wire gds., cs.	2	50		Tinware, cs.	3	10
London.				Clocks, cs.	2	8
Hdw. pkgs.	172	5,656		Mf. iron, pkgs.	5	30
Pumps, pkgs.	3	115		Hdw. case.	1	6
Mf. iron, pkgs.	363	5,725		Madagascar.		
Iron drums.	130	110		Hdw. pkgs.	2	8
Sew. ma. cs.	89	7,983		Cutlery, cs.	38	882
Ox. zinc, bbls.	100	797		Hdw. pkgs.	183	2,345
Clocks, cs.	130	3,011		Clocks, cs.	35	672
Saws, cs.	2	52		Nails, kegs.	134	998
Ag. imp. pkgs.	67	1,191		Tacks, cs.	5	35
Mach'y, pkgs.	148	9,064		Nails, cs.	17	92
Tinfol, case.	1	30		Pumps, pkgs.	1	80
British Australia.				Cotton gins, cs.	5	265
Mf. iron, pkgs.	229	1,887		Revolvers, cs.	2	351
Scales, cs.	369	6,668		Scales, cs.	8	92
Pumps, pkgs.	38	1,709		Mach'y, pkgs.	30	2,252
Tacks, cs.	34	294		Mf. iron, pkgs.	10	180
Cartridges, cs.	11	260		Tinware, cs.	48	1,414
Air guns, cs.	2	75		Sew. ma. cs.	54	773
Nails, cs.	37	356		Br. goods, cs.	2	252
Sew. ma. case.	32	1,020		Cartridges, cs.	12	614
Tinware, cs.	2	9		Rules, cs.	3	142
Wash. mach.	9	635		Naples.		
Wire gds., case.	1	30		Hdw. cs.	8	287
Cutlery, case.	1	6		Mach'y, pkgs.	2	100
Ag. imp. pkgs.	1	180		United States of		
Tacks, cs.	103	3,092		Sew. ma. cs.	127	3,275
Saws, cs.	22	872		Hdw. pkgs.	116	2,775
W. mills, pkgs.	36	1,190		Mach'y, pkgs.	187	5,748
Axles, cs.	28	484		Tinware, cs.	19	414
Mach'y, pkgs.	11	456		Y. metal, cs.	2	147
Bells, pkgs.	7	170		Scales, cs.	4	128
Hdw. pkgs.	116	16,460		Guns, case.	1	61
Mach'y, pkgs.	71	6,963		Pumpbago, bbls.	2	80
Spring, cs.	3	305		Tacks, cs.	2	41
Wringers, cs.	1	137		Sew. ma. cs.	291	3,208
Cartridge cs.	1	62		Copper, case.	1	121
Newfoundland.				Clocks, cs.	14	379
Plumbers' material, pkgs.	4	60		M. Ralls.	24	50
Ag. imp. pkgs.	10	108		Ag. imp. pkgs.	4	65
Tacks, cs.	3	62		Copper goods.		
Tinfol, cs.	2	62		Water wheel.	1	340
Catania.				Lead pipe, bbl.	7	70
Revolvers, case.	1	160		Mf. iron, pkgs.	428	2,574
British West Indies.				Sew. ma. cs.	1,432	
Mf. iron, pkgs.	46	295		Scales, cs.	45	674
Y. metal, cs.	4	214		Wire gds., cs.	2	89
Tinware, cs.	10	204		Lead, bars.	3	15
Ag. imp. pkgs.	7	60		Mf. iron, cs.	101	1,890
Wagon nail.				Br. gds., cs.	127	148
Pumps, pkgs.	7	815		Nails, kegs.	183	434
Iron safe.	1	50		Steel, case.	1	30
Nails, bbs.	46	142		Arms, cs.	6	891
W. mill nail.				Cartridges, cs.	127	7,400
Wrigs.	14	222		Tin, cs.	2	101
Revolvers, case.	1	89		Iron safes.	2	107
Arms, case.	1	89		Pumps, pkgs.	5	67
Clocks, cs.	1,252	3,625		Argentine Republic.		
Nails, kegs.	112	377		Sew. ma. cs.	291	3,208
Sew. ma. cs.	3	28		Scales, cs.	37	519
Scales, cs.	21	369		Mf. iron, pkgs.	227	3,511
Clocks, cs.	4	54		Nails, bbs.	250	914
Iron, pkgs.	10	129		Cutlery, cs.	12	163
Mach'y, pkgs.	4	54		Car-wheels.	100	816
Cartridges, cs.	16	239		Wagons.	11	2,275
Canada.				Arms, case.	1	105
Tin plate, bxs.	536	1,032		Tacks, case.	10	140
Sht. iron, pkgs.	5	1,712		Ag. imp. pkgs.	442	9,848
Eyelt hooks.	3	514		Mach'y, pkgs.	211	8,425
British Honduras.				Engines.	4	4,950
Cutlery, cs.	3	78		Shoe nail's, cs.	100	370
Nails, kegs.	22	72		Steel, case.	2	60
Mf. iron, pkgs.	1	30		Clo. sks.	45	2,398
Nova Scotia.				Distilling app.		
Tin, cs.	7	74		pkgs.	13	1,290
Stamped ware				Argentine America.		
cs.	3	78		Mf. iron, pkgs.	178	270
Sew. ma. case.	1	30		Tin, cs.	11	185
Iron, cs.	7	30		Iron, pkgs.	34	57
Hdw. cs.	4	174		Nails, kegs.	10	38
				Nails, bbs.	2	38
				Steel, case.	1	175
				Hdw. cs.	27	462
				Sew. ma. case.	1	21
				San Domingo.		
				Tin, bbs.	4	58
				Hdw. case.	1	26
				Sew. ma. cs.	3	49

MANUFACTURING.

Iron and Steel.

It is reported that Lucinda Furnace (anthracite), in the Schuylkill Valley, Pa., which has been idle for nearly four years, will be repaired and blown in shortly.

About 500 employees of the American Tube and Iron Company's mill, at Middletown, Pa., have struck by order, it is said, from the headquarters of the Knights of Labor of Philadelphia. The strike is ascribed to the refusal of the company to restore the wages of 1883 and to reinstate two Knights of Labor who had been discharged.

A meeting of the Tube and Pipe Manufacturers' Association was held at the Monongahela House, Pittsburgh, last week. The propriety of increasing the price of goods was discussed, but in view of the conditions it was thought best merely to reaffirm the old prices. The association adjourned to meet in Philadelphia August 25.

An order for 600 tons of steel plates and girders is being turned out by the Linden Steel Works, Pittsburgh. It will be used for the construction of the Vanderbilt yacht in New York.

The new works of the American Tube and Iron Company, at Youngstown, are about two-thirds finished and will be ready to start in October. The capacity will be about 150 tons a day. At the present skelt iron bought in the district will be used, but the company intend eventually to build puddling furnaces and a rolling mill to make their own skelp iron.

Lindsay & McCutcheon, proprietors of the Star Iron Works, in Allegheny, Pa., have commenced work on a new iron building to take the place of the wooden structure destroyed by fire recently. It will be 250 x 80 feet. They are also erecting a very strong brick building which will have three stories above ground and one below. This will be used as a wrought-iron strap and tie hinge factory. The whole will cost \$50,000 or \$55,000, and will be constructed by the well-known iron builders, Messrs. Anderson, Porter & Boyd, of Allegheny.

Hussey, Howe & Co., Limited, steel manufacturers of Pittsburgh, will close down their works in all departments on August 1, for the purpose of stock-taking and making repairs. The above firm ship annually to various parts of the German Empire and to Sweden 100,000 steel rake teeth of light, springy $\frac{3}{4}$ -inch steel, completed and ready for use by the manufacturer of the hay rake. This trade they have enjoyed for five or six years.

Oliver Bros. & Phillips, of Pittsburgh, are filling a large order for bolts for the Union Pacific Railroad. Eight carloads have already been forwarded.

The employees of the Pennsylvania Tube Works, at Soho, near Pittsburgh, have received an advance of 10 per cent. in their wages. About six months ago the men were reduced 10 per cent., and the officials of the company promised to restore their old wages as soon as the price of pipe advanced. The large demand for pipe caused by the natural-gas operations advanced prices about a month ago, and the firm, true to their word, gave the advance.

The St. Louis (Mo.) Shovel Works have been awarded a contract by the Interior Department to furnish all of the Indiana agencies with shovels for the current year. They are now engaged in filling the first requisition. They have just shipped 102 bundles of shovels to Mexico.

At a meeting of the directors of the Thomas Iron Company, of Hokendauqua, held on the 22d inst., the usual 4 per cent. semi-annual dividend was declared. The above company have blown out their Keystone Furnace for the purpose of making repairs. It will blow in again as soon as repairs are completed.

The Cherokee Furnace Company, of Georgia, will soon extend their E. and W. Railroad to Birmingham.

Machinery.

The Mason Machine Works, Taunton, Mass., are building six large mules for the Wamsutta Mills corporation. Up to a short time ago this corporation ordered all its machinery from England, under the impression that nothing suitable could be purchased in this country. A loom made by the Mason Machine Works, which did excellent work, changed the direction of the orders, however.

The Pond Engineering Company, of St. Louis, Mo., have been awarded the contract for the pumping engines for the new Philadelphia, Ohio, water works. They will be of the Blake duplex type, having a capacity of 2,000,000 gallons per day.

George E. Lloyd & Co., of Chicago, have about completed a new wire staple machine for Griswold & Co., Troy, N. Y., which will make from 2500 to 3000 staples per minute. The recent shipment of electrotyping and stereotyping machinery made by this firm to the Chicago Electrotyping and Stereotyping Company amounted to over \$5000, and is thought to have been the largest order of the kind ever given in the West. There is in process of construction at their works the seventh complete outfit of stereotyping machinery for the Western Newspaper Union, Chicago. They have just finished a large stereotyping outfit for one of the manufacturers of Webb presses. The works are running 13½ hours a day.

The Acme Machinery Company, Cleveland, are very busy running 12 hours a day on orders, and no stock on hand. They are putting in more tools and machinery; have just put up a storage-house for castings, and are making many improvements to their plant.

The Columbia Water Company, Columbia, Tenn., will enlarge their plant by building a new reservoir and a new pump-house and putting in additional machinery.

The Jones Tubular Grate-Bar Company, of Milwaukee, representing a capital stock of \$400,000, have filed articles of association.

The incorporators are H. E. Jacobs, C. W. White, of Milwaukee, and A. R. Jones, of Madison. The object of the company is to deal in grate-bars and other furnace appliances.

R. M. Brooks, Jenkinsville, Ga., is negotiating for machinery for his new foundry and machine shop.

The Ottumwa Iron Works, Ottumwa, Iowa, have shipped a pair of double hoisters to Coal Hill, Ark., and entered orders for one pair double cylinder four-drum tail rope engines and one pair of two-drum tail rope engines for shipment to the Lody Coal Company, of Chattanooga, Tenn. In addition to these we understand they have a very fair trade in stationary engines and general machinery.

A shipment of two locomotives, several cars and large supplies of railway material to the port of Almeria, on the Spanish Coast, on account of the Marvel Iron Ore Company, was made from New York City last week. Steel rails for the construction of a road at the company's mines go direct from England.

All the machinery and tools pertaining to the chain shop at West Middlesex, Pa., have been purchased by P. H. Stendish, of Cuyahoga Falls, Ohio, who will at once remove them to that place.

The Wilson-Snyder Mfg. Company, Pittsburgh, have secured the order from the City Water Committee for two duplex plunger pumps of 1,000,000 gallons daily capacity each. They report plenty of orders. They have lately sent a 21-inch duplex plunger pump, 4-foot stroke, to the Edgar Thomson Steel Works. This is one of the largest pumps of the kind in this part of the country.

The Erie Engine Works, Erie, Pa., are active. Recently they received orders from Caribou, Me.; San Francisco, Cal., and the City of Mexico. Within the past two weeks they had 25 engines and 14 boilers on their books for immediate shipment.

The Chicago, Burlington and Quincy Railroad are equipping 50 of their cars at the Peninsular Car Works, Detroit, Mich., with the Ames car coupler.

The Warner & Hough Machine Company have their new shops in St. Paul, Minn., nearly completed, and will be at work in them within a month. The machine shop is 100 x 50 feet, and the foundry 40 x 70 feet. They will build steam engines and special tools for machine shops. They have accepted the agency for Pedrick & Ayer's railroad repair shop tools, also for Harrington's hoists and elevators.

The Deane Steam Pump Company, of Holyoke, Mass., are engaged in the construction of pumps having a capacity of 4,000,000 gallons each, for the cities of Montgomery, Ala.; Pensacola, Fla., and Charleston, W. Va., and of 2,000,000 each for Vincennes, Ind.; Sterling, Ill., and Gadston, Ala.

McLanahan & Stone, founders and machinists, of Hollidaysburg, Pa., are building a set of their new ore jigs for the Keystone Manganese and Iron Company, of Batesville, Ark., and also one set for the Aetna Iron Company, of Aetna, Tenn.

The Wainwright Mfg. Company, 65 and 67 Oliver street, Boston, Mass., and 93 Liberty street, New York, manufacturers of feed-water heaters, superheaters, filters, expansion joints, radiators and corrugated tubing, have been forced by their numerous orders to enlarge their plant, and are erecting an addition to their factory of four stories, 31 x 78 feet. This will contain the machine shop and corrugating and radiator departments. Their former building has been moved, and will also be utilized as a machine shop. By this change they will be enabled to increase their product three or four times.

The Jarvis Engineering Company, Boston, Mass., have closed a contract with the Nashua Electric Light Company, Nashua, N. H., for a complete steam plant to consist of a 60-horse-power Armstrong & Sims Company engine, boiler set with the Jarvis patent furnace, Sheffield grates, heater pump and injector. Work will commence at once.

The works of the Union Foundry and Machine Company, of Prohle avenue, Allegheny, Pa., were destroyed by fire Tuesday morning, the 20th inst., entailing a loss of \$25,000. The building, which was of brick and frame, covered an area of 2½ acres. It was totally destroyed, except a small portion built of brick. About 200 men will be thrown out of employment. Natural-gas fixtures and fittings of metal frames for safes were manufactured in addition to general foundry-work.

Thompson, Epping & Carpenter, of Pittsburgh, have within a week shipped a mining pump to Deadwood, Dak.; two hydraulic pumps for Park Bros. & Co.'s new mill, two boiler feed pumps to the De Pauw Glass Works, New Albany, Ind., and have received orders for a large mining pump for Steubenville, Ohio, and two for Birmingham, Ala. Their works are running full force and time.

D. B. Cruickshank, machinery dealer of Providence, R. I., has shipped the following machinery during the month of July: A 15-horse-power boiler to the Carmichael Mfg. Company, Shannock, R. I.; a 6 x 12 hoisting engine and boiler to Cutting & Bishop, Worcester, Mass.; a 15-horse-power boiler to Wauregan Brick Company, Danielsonville, Conn.; a No. 5 Webber pump and 6 x 12 hoisting engine to F. E. Shaw, Ware, Mass.; a 30-inch x 15-foot engine lathe and 15-inch x 6-foot speed lathe to the American Indurated Fiber Company, Mechanicville, N. Y.; 300 feet 2½" shafting to S. H. Greene & Sons, River Point, R. I. Mr. Cruickshank reports business unusually brisk this month.

The Bignall & Keeler Mfg. Company, of St. Louis, Mo., are running full time and full handed. They have in hand orders which will keep them busy for some time. They have lately shipped one of their No. 6 Peerless pipe cutting and threading ma-

chines to Chicago. A No. 12 machine was shipped to the same city on the 26th inst. Smaller machines have been sent to Pittsburgh, Kansas City, New Bethlehem, Pa., and Columbus, Ohio. They are now filling orders for Syracuse, Pittsburgh, Toronto, Canada, Deming, New Mex., and Kansas City, Mo. In their wood-working department they are very busy, working on orders exclusively. They are building machines for shipment to the Argentine Republic, Arizona and Louisiana. The local trade also is brisk, and prospects are encouraging.

Miscellaneous.

R. C. Snowden, of Elizabeth, Pa., informs us that he has recently been granted a patent for a sheet-metal shingle, and has formed a company for the purpose of manufacturing the same. The site selected for the new works is McKeesport, Pa., and when completed they will have a capacity of 350 to 400 squares per day. About 100 men will be employed at the start.

The Cincinnati Corrugating Company, of Cincinnati, Ohio, are extensively engaged in the manufacture of fire-proof corrugated iron arches for ceilings, and iron for roofing and siding.

It is rumored that the proprietors of the Beaver Falls Cutlery Works, at Beaver Falls, Pa., dissatisfied with its success so far, are contemplating the converting of the works into a steel-nail manufactory. The important feature of the undertaking is that it is intended to make the new concern co-operative. A number of the employees, together with certain of the stockholders and some Pittsburgh nail feeders, are interested in the scheme. The plan is not fully consummated, but it is now receiving serious attention.

During the six months of this year ending June 30 the receipts for gas supplied by the Philadelphia (Westinghouse) Natural Gas Company, of Pittsburgh, averaged about \$130,000 per month. Owing to the extensive improvements in the company's old lines the expenses have averaged \$45,135.98 per month. The managers expect the receipts of the remainder of the year to exceed those of the first six months and the expenses to be less. The total operating and other expenses for the three months from April 1 to July 1 were \$155,621.92; total earnings from gas, \$394,401.18; net earnings, \$238,779.26; dividends, \$150,055.91.

The Ensign Car Works, at Huntington, W. Va., have orders booked sufficient to keep the concern running for a year. Last week 40 cars were turned out for the Annapolis and Baltimore short line.

The Monumental Seal Lock Company, capital stock \$100,000, have been incorporated at Baltimore to manufacture locks, with Nicholas G. Penniman, John A. McGarry, Robert A. Dobbin, W. F. Beasley and William Gilmore as directors.

The Butler Plate Glass Company, of Butler, Pa., will soon be in operation. The company own 20 acres of land in Butler, upon which five buildings are being erected. These are for the melting, annealing, grinding, cutting and shipping departments. Three of the buildings are now under roof and the others will be completed by January 1, if not sooner. The works will have a capacity of 4000 square feet of glass per day, and about 400 persons will be employed.

Bridgeport Brass Company, Bridgeport Conn., will erect at an early day a new wire and tube mill adjoining their present buildings. It will be of brick, 40 x 200 feet, and three stories in height.

The following table, from the Marquette (Mich.) Mining Journal, exhibits in gross tons the total lake shipments of iron ore from the mines of the Marquette and Menominee ranges for the current season up to and including Wednesday, the 14th, together with the shipments from the same ports for the corresponding period of last year:

Name of port.	1886.	1885.
Marquette.....	344,246	249,508
Escanaba.....	584,168	507,633
L'Anse.....		15,229
St. Ignace.....	21,778	32,322
	950,192	805,192

The increase in lake shipments from the two ranges named for the current year was 144,700 gross tons. The Vermilion mines have forwarded by lake this season 7410 gross tons more than they had shipped at the corresponding date last year. Adding to these amounts the output of the Gogebic mines to date of the 14th, and we find that the gain for this season over that of 1885 at the same stage is 367,905 gross tons.

Fire-brick is a commodity in the manufacture of which notable progress has been made at Birmingham, Ala. Not long since every brick that went into a furnace stack or stove in the Birmingham district came from the North. Now the Birmingham Fire-Brick Works, which commenced operations about a year and a half ago, sell to all but one of the concerns now making iron, and have orders from nearly all of those that are building. Their brick, it is said, has been tested with satisfactory results at as high a temperature as 2400°, while at average furnace and rolling-mill heats their staying qualities have been proved. Turning out brick at the rate of 6,000,000 a year, the works are still considerably behind in their orders. The bulk of their product is sold near home, though they now have sales agents in most of the leading cities of the North. The clays are not found near Birmingham, but are carried from long distances.

Sebastopol and other Black Sea ports are now protected by an electric apparatus placed in the sea to destroy hostile torpedo-boats. The construction of the apparatus, which is the work of American engineers, has been kept secret.

Hardware Novelties.

The Universal Wagon Jack.

The accompanying illustrations, Figs. 1 and 2, represent this article, which is made by the American Tool Company, Cleveland, Ohio, under a patent May 4, 1886. Fig. 1 shows the jack lowered and Fig. 2 shows

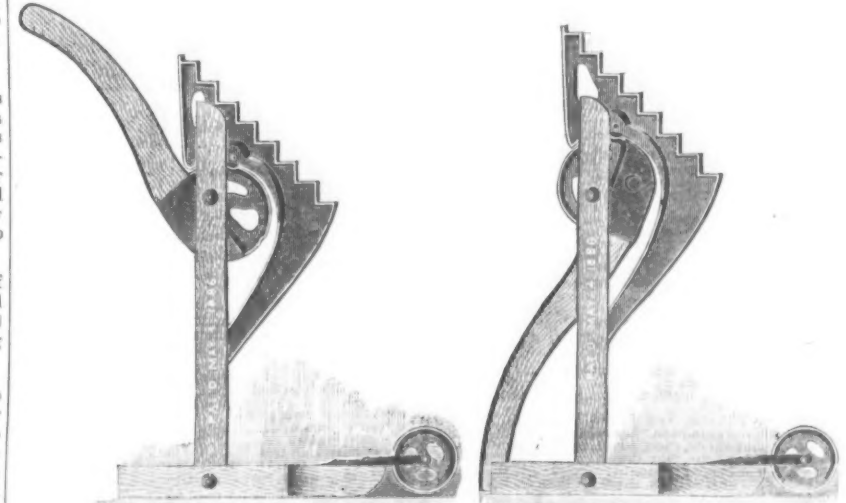


Fig. 1.—Universal Lifting Jack, Lowered. Fig. 2.—Universal Lifting Jack, Raised.

it raised. The lever, it will be seen, works in and against a rolling bearing, and will be recognized as effectively applying the power. The step bearings are for the purpose of allowing the instant application of the jack to vehicles whose axles are at various heights. The roller, as shown in the cut, is referred to as giving a wheelbarrow motion for rapid and easy transfer to any place or position. The simplicity and strength of this article are alluded to by the manufacturers, who also make the point that there are no ratchets or pawls in its construction, and that it sustains the load raised at any point. Its lifting capacity is stated to be 1500 pounds.

Adjustable Cover.

Topliff & Ely, Elyria, Ohio, are manufacturing an adjustable cover the special features of which are shown in the annexed illustrations. The object of the invention is

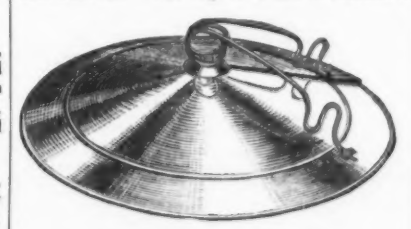


Fig. 1.—Cover, Full Size.

to furnish a cover that will fit different sized articles. In order to accomplish this the cover is made as represented, Fig. 1 showing the cover at its largest adjustment and Fig. 2 showing it when contracted to its smallest size. With this arrangement the covers contract about 2 inches, so that a 10-inch cover will fit holes from 8 to 10 inches in diameter. Where the pot flares so that the

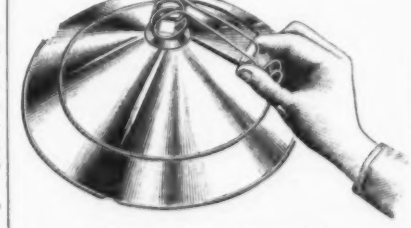


Fig. 2.—Cover Contracted.

spring of the cover would tend to throw the cover out there is, it will be observed, a little hook to hold the cover at any size desired.

The Peerless Target Pistol.

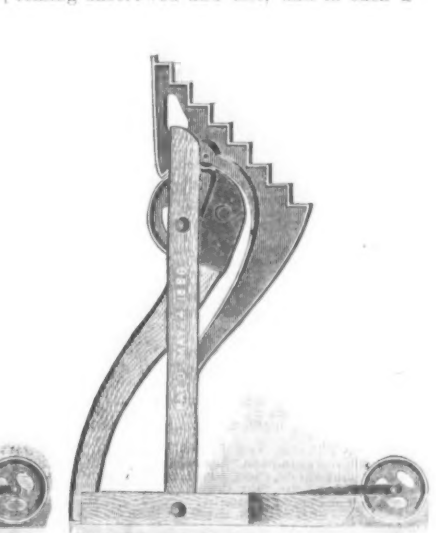
This article is manufactured by the Bay State Arms Company, Uxbridge, Mass., for whom John P. Moore's Sons are agents, 302 Broadway, New York, and is, it will be perceived, in its action practically the same as their rifles. It has a rebounding lock and a vertical sliding breach block, operated by the guard, as a lever, which when thrown down ejects the empty shell from the chamber, and with sufficient force to carry it, it is estimated, 6 or 8 feet from the shooter. The importance of this feature is alluded to as permitting very rapid firing. The barrel is fastened to the frame by a tapering screw key, easily removed by the hand, which passes through the frame and section of the



The Peerless Target Pistol.

barrel laterally, keeping the barrel always in its proper position, and by its taper shape compensating for any wear of surface. The patent breach block is so constructed that a lateral motion is obtained by the firing pin sufficient in extent to strike either on the rim or in the center of any cartridge used. This, it is stated, can be done with but little trouble, and when one barrel is changed for a larger or smaller caliber it is readily adjusted for that size. A tip or fore-end and extractor go with each extra barrel, and

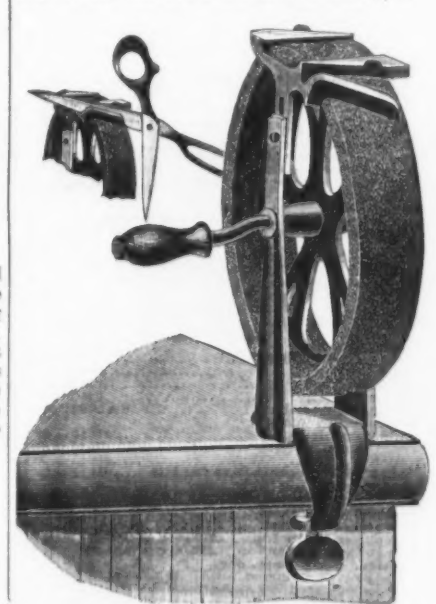
when a change is made only two screws need be removed to accomplish it. The handles and tip are of rubber, finely checkered. The skeleton breach is held in place by a dowel pin at the top of its bearing surface and the attaching screw at the base. This screw is a knurled thumb screw, arranged with a check nut to prevent its becoming unscrewed and lost, and in such a



position as to be entirely free from liability to catch in the brush or clothing. Barrels will be furnished 12, 15, 18 and 20 inches long for the trade, and different sizes and lengths made to order as desired. They will be finished either in nickel plate or case hardened, as ordered. Attention is called to the fact that the facility with which the barrel and skeleton breach can be detached permits the pistol to be packed in a very small space.

The Household Emery-Wheel Knife-Sharpener.

The Crystal Emery Wheel Company, Northampton, Mass., manufacture and offer to the trade the Household Emery-Wheel Knife-Sharpener, the patent for which was but recently granted. The construction and operation of the device is so clearly indicated in the accompanying illustration that but a brief description is necessary. The wheel, which is 6 inches in diameter, is



The Household Emery-Wheel Knife-Sharpener.

fastened to a table by means of a clamp and thumb-screw and is turned by an ordinary crank. The center of the wheel is of cast iron, and the rim, which is 1 inch broad is of solid emery. The wheel is for sharpening knives, scissors, and other cutting implements, and being of emery the grinding is done without water. The adjustable table with a guide, as shown in the cut, is referred to as a great convenience, for it enables those who are not familiar with the use of a sharpening wheel to hold the scissor or knife blade at the proper angle against the surface of the emery and thus grind the edge accurately. The table, it will be noticed, may be raised or lowered by turning a screw, and may be removed entirely if desired. The smaller cut at the left shows the position in which the scissor blade should be held for sharpening.

Mr. Thorsten Nordenfeldt, the well-known engineer, recently obtained a patent for propelling vessels and rendering invisible the

smoke discharged by them. This is effected by placing the smoke outlet or outlets beneath the water line and forcing air at a sufficient pressure into the stokehold, which is practically air-tight, or by forcing the air directly into the boiler, or by sucking air through the boiler and forcing it into the sea. The smoke in its passage upward through the water, being sufficiently subdivided, becomes washed, its solid particles are precipitated, and it is claimed it is rendered invisible, or nearly so.

Standard Machines.	dis 50.25
Cheaper Machines.	dis 50.10 to 60.00
Lemon Squeezer.	
Porcelain Squeezer, No. 1.....	dis 50.00, dis 25.30
Wood, Common.....	dis 3.00, dis 3.50
Wood, Improved.....	dis 3.75, dis 4.25
Samuel's, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	

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MECHANICAL.

Polishing the Interior of Metal Tubes.

Within the last 20 years the pneumatic system of transmitting packages has been brought to a practical success, but the tubes, which form one of the principal parts of the apparatus, are very expensive on account of the absence of expeditious means to produce the necessarily smooth and uniform interior required for this purpose. A machine has been invented and recently patented which presents a number of valuable features, and presents probably a complete solution of the problem of rapidly polishing the interior of long sections of iron or other metal tubing, so that the cost is not increased beyond an improper limit, and especially adapts them for the pneumatic system of transmission, to the exclusion of the expensive brass tubes that have been usually employed for that purpose. The machine, as we find it described, consists essentially of a strong iron bed of a trough shape, and of a length to suit the size and length of the pipes to be smoothed. At one end of the bed is attached mechanism for giving a rotary motion to a long bar which has secured to the outer end one or more cylinders of emery. The pipe is held by means of a sleeve which is carried along the bed-plate on a slide, by means of suitable feed mechanism, at the exact speed desired. The sleeve has a pulley attached to it which is slowly revolved by means of a belt in an opposite direction to that of the bar to which the emery cylinders are attached. In connection with the smoothing mechanism is a hose which is so arranged that its nozzle is carried along with the pipe to furnish water for clearing the bore of cuttings, &c., as the smoothing process proceeds.

In operation the bar, with the emery cylinders, is given a rapid speed, then introduced in the end of the pipe, when, being driven in an opposite direction at a slow speed and the interior being lubricated with water, the smoothing proceeds through the pipe at a fair rate, predetermined by the feed apparatus. When the pipe has reached the limit of its movement the operator, by means of a lever, shifts the belts so that the movement of the feed is reversed and the sleeve and pipe are moved back to the place from which they started, when the pipe is removed and another placed in position to undergo the same operation. This machine is so perfectly adapted to the purpose that long pieces of pipe are perfectly smoothed to a uniform diameter at a very rapid rate. The machine will accomplish its work with an operator of ordinary skill, and will greatly cheapen all kinds of tubing in which a smooth interior is required.

Marine-Engine Valve Gear.

One peculiarity of the use of very high pressures in marine engines is that slide-valves cannot be used. The power required to work them is enormous, and the surfaces rapidly wear out and become leaky. Consequently piston-valves are employed of necessity, and these are of very large dimensions and great weight. If the number of revolutions were small this would not matter much, but at high speeds just the same difficulties are encountered in dealing with these piston-valves as those which crop up with the pistons and other reciprocating parts. Momentum and inertia come into play. In the case of the main pistons these can be combated by compression and lead. For obvious reasons, however, the inertia and momentum of piston-valves do not admit of being fought by compression. This was shown by the English engineers, Messrs. Marshall and Wightman. In a paper prepared by them a short time ago they give diagrams of crank-shaft strains and moments, obtained by experiment and calculation with piston-valves weighing respectively 500 pounds and 1500 pounds, from which they deduce the formula $S = \frac{R^2 \sqrt{W}}{50}$ and

$S_1 = \frac{R \sqrt{W}}{2.54}$, where S = maximum resistance of one valve in pounds at beginning of stroke, S_1 = mean resistance of valve in pounds during the whole stroke, R = revolutions per minute, and W = weight of valve and rod in pounds. Thus it will be seen that the stresses augment as the square of the number of revolutions, and as the square roots of the weights. Consequently, at comparatively moderate speeds, it would be almost impossible to make valve gear which would stand the strains to which it would be subjected.

Circulation in Steam Boilers.

The great influence, remarks the *Locomotive*, which the circulation of the water in a steam boiler when it is in operation exercises upon its efficiency, its tendency to foul up, and its liability to various annoying defects, does not seem to be fully understood or appreciated by many to whom it is of the greatest importance. Were it not for the fact that heat applied to the under side of a body of water is communicated to it, thereby expanding it and causing it to rise through the colder water above and producing a circulation, it would be practically impossible to generate steam in the ordinary manner. The efficiency of any given area of heating surface depends almost wholly upon the perfection of the circulation of the water in contact with it. This will probably be better appreciated when it is stated that the experiment has been performed of immersing a cubical metallic box in water and heating it from the inside. The horizontal upper surface of the box generated more than twice as much steam per square foot of surface as the perpendicular sides, while the bottom or lower side generated none at all. This was due to the fact that the steam bubbles or vesicles formed in contact with the upper surface had nothing to interfere with their prompt liberation from that surface; the heated water was equally free to rise, its place being immediately filled by a fresh supply of colder water, thus forming a rapid circulation; the operation went on with greater difficulty in contact with the vertical surfaces, while with the lower horizontal surface the steam as formed would have a tendency to hug the surface and prevent

the contact of water with it, thus effectually preventing any circulation. When these facts are appreciated it will readily be seen how essential it is to the proper performance of a boiler that the water spaces should be large and as free from obstruction as possible, in order that the water may have opportunity to circulate rapidly, and the steam when formed be disengaged as freely and quietly as possible.

Hot Water Heating.

Mr. L. S. Daniels of the Hopson & Chapin Mfg. Co., of New London, Conn., writes us as follows on the subject of hot-water heating:

Having been interested for the past 18 years first in the manufacture and later in the erection of heating apparatus, the writer has taken great interest in the articles which have appeared in the columns of your paper on this subject, and should the ideas here expressed seem of sufficient merit you are at liberty to publish them. The writer first came in contact with hot-water low-temperature direct heating in 1877 in the British Provinces, where he was interested in the heating business for several years, and for some time was not convinced of its superiority over steam, neither does he think so now in all cases. Each has its merits under certain conditions, and it is the duty of a heating engineer, judging from past experience, to determine which method is best adapted to heating any particular

and constructed boiler. This is the heart of the whole subject. From what has been written on the subject the inexperienced may have been led to suppose that a few feet of pipe coiled in the top of a stove or exposed to the fire in almost any shape is all that is required, but such is not the case. The coil boilers which have been referred to in your paper as in use in Canada are not generally constructed of coiled pipes, as might be supposed, but are formed of horizontal pipes set on a slight incline, and connected with headers or branch tees and return bends very similar to an ordinary box coil, with a portion of the pipes left out to form a fire-box, giving pipes on either side and over the fire. In many cases the grate also is formed of pipes which contain water. There are objections to this form of heater, one of which is excessive consumption of fuel. Another objection is a tendency to collect dirt, which is difficult to remove. A heater for heating by hot-water circulation should be of a construction that will collect the smallest amount of dirt possible and be accessible for cleaning, and the first requirement is of as great importance as the second. In ordinary house heating little care is taken to keep the boiler free from deposits, and it is seldom that a heating boiler receives the care that is ordinarily given to one used for mechanical purposes. An illustration from personal experience will perhaps give a better idea of the general carelessness with

in use for hot-water heating contains a large amount of water the circulation will not start so quickly as one with smaller capacity, but will not be so "flashy" and will retain its heat longer, and consequently will be more easily managed and give better results.

There is more difficulty in regulating the fire by an automatic arrangement with small boiler capacity than when a liberal amount of water is used. As to the radiation it should be ample to heat the building in the coldest weather to the desired temperature, and so arranged that the water will not boil in any part until the contents of the entire circulation reach that temperature. Fig. 1 of the engravings shows $\frac{3}{4}$ -inch pipe to and from the expansion-tank. A steam fitter of large and long experience advised the writer long ago that less than $\frac{3}{4}$ -inch pipe was unfit for any steam connection except to steam gauge, and experience has since shown that this was wise; and, as steam gauges are not used in hot-water circulation, he is convinced that smaller than $\frac{3}{4}$ -inch pipe should never be used in this business. In place of the safety-valve on a steam-boiler low-temperature hot-water circulation leaves the overflow from the expansion-tank always open, and who would think of using so small a steam safety-valve as $\frac{3}{4}$ inch. A number of years ago two houses in the same block were completed with direct hot-water heating apparatus and left with heat on at night.

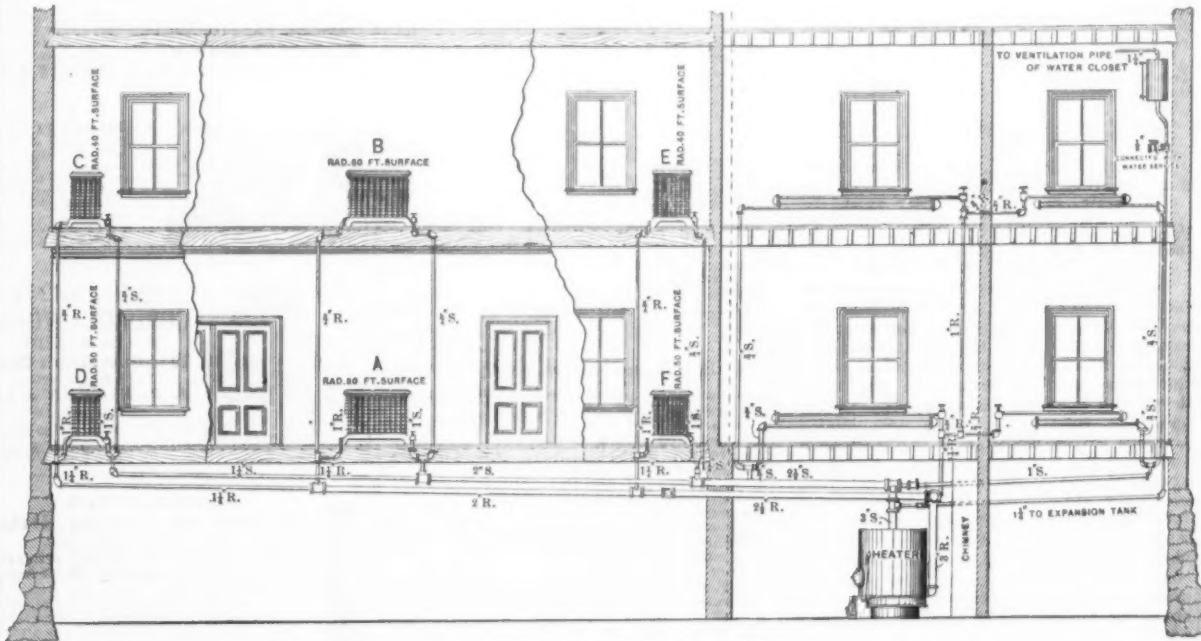


Fig. 1.—Vertical Section of Building.

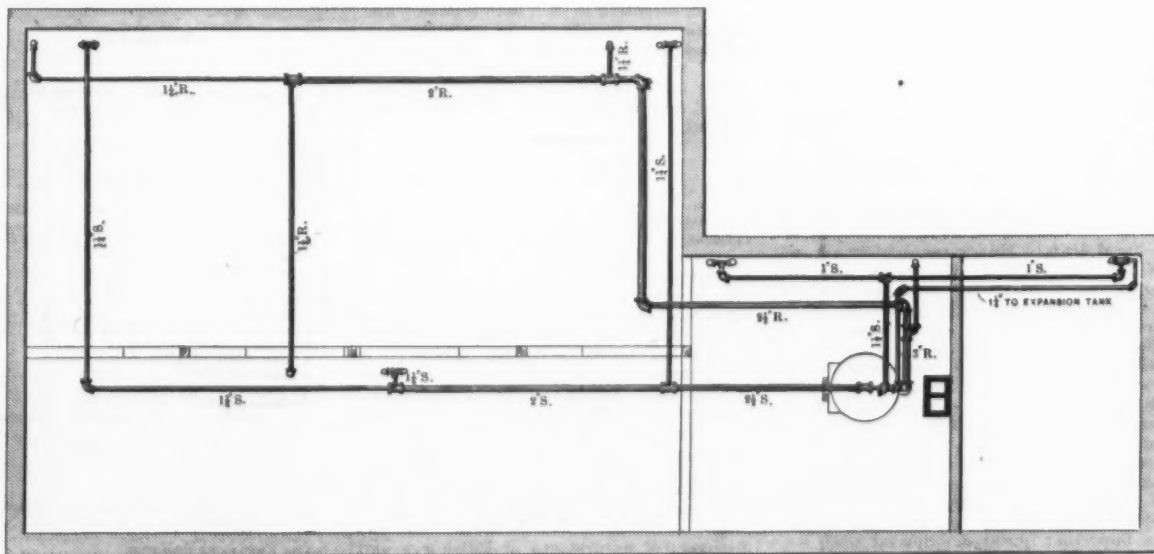


Fig. 2.—Cellar Plan of Building.

HOT WATER HEATING, PLANNED BY L. S. DANIELS, OF THE HOPSON & CHAPIN MFG. CO.

class of buildings, but for heating hotels, residences and public buildings in constant use steam is not to be compared with hot-water circulation as a safe, simple and satisfactory method of heating. First, for reason of mildness of the heat. Second, because of its being susceptible of a great range of temperature. Between the 38th and 44th parallels of latitude the days are comparatively few when any heating apparatus need be run to its full capacity. If properly constructed, to give satisfactory results in the most extreme weather. Artificial heat is required generally in October or earlier, but very cold weather does not come till about January, and after February the need of heat grows less until June. There are about eight months in which artificial heat is required, but for about five months the need is for only a moderate temperature. Under the foregoing circumstances the most desirable method of heating is that which allows of the greatest range, other things being equal.

Safety is a matter of great importance, and with hot water there is none of the danger of fire which accompanies all hot-air furnaces, there being no pipes which could in any case become heated sufficiently to ignite wood.

A properly-constructed low-temperature hot-water heating apparatus is so simple that there is no need of the safety appliances that are found indispensable in low-pressure steam heating, the hot-water boiler being always open to the air, and, like a tea-kettle, will simply boil over. Heating engineers know to their cost the large proportion of users of steam heat in residences who are incapable of using judgment in the care of such apparatus, and often leave its management to servants who know little and care less about the matter.

In considering what constitutes a desirable hot-water direct-heating apparatus the first aim should be to get a properly devised

which a heating apparatus for a residence is used than any other form of argument. Being called to look for the reason of the failure of a horizontal tubular boiler to give satisfactory results after one season's use, the house being filled with smoke, making it impossible to use it, although proper flue tools and tube-cleaners were furnished with the boiler, it was found that the tubes of the boiler were filled with ashes and dirt, on removal of which there was no trouble with the draft of the boiler. It was apparent at once that the boiler had been in care of a servant and the tube-cleaner never used. The ground the writer would take is this: A heating boiler, to give proper results, should be so constructed as to keep itself free from dirt as far as possible and at the same time have every part accessible for cleaning. This can be accomplished by using a boiler with flat vertical heating surface, the writer's experience being that a flat vertical surface will not collect deposits to any great extent by continual use, and boilers so constructed will remain in use for years and give good results.

The heating surface of a boiler for hot-water heating should be large to enable it to be so run that the products of combustion would not leave the boiler at a high temperature. The grate should also be ample, the fire-carried deep, so that combustion will take place slowly. The heating surface over the fire should be much lower than where combustion is more rapid, as in a boiler for manufacturing purposes. In hot-water heating it is to be remembered that the whole system is dependent upon the principle that water expands when heated, and consequently becomes lighter, with a tendency to ascend and move the colder water before it. The current so formed moves slowly, and to assist a rapid circulation the boiler should be constructed to allow the circulation to be vertical as far as possible. If a boiler

The expansion-tanks were made of copper, and they were connected in the corner of the bathroom in a manner similar to that shown in the cut referred to, except that $\frac{3}{4}$ -inch connections were used. On visiting them the next morning one was found collapsed, and on taking down the overflow it was found to be choked with red lead, which, as the boiler became heated, the current had deposited at the highest point; when during the night the heat in the boiler diminished a vacuum formed, with the above result. It has been stated that where it is possible to divide the house into sections it is an excellent plan to fit valves to control the sections, and that occasionally valves are put on the coils, not for the purpose of shutting them off, but for the purpose of regulating the flow.

The writer would hold an apparatus far from what it should be if valves were ever necessary for any such purpose. A cellar plan and a vertical section of a building are here submitted. They show the method practiced by the writer in hot-water direct low-temperature heating, of using pipe calculated to give an even circulation, and dispensing with valves for the purpose of controlling the flow of water.

The radiators A and B are situated in the hall, and C D E and F in the four rooms out of the same. It will be seen that the supply is headed where any two risers are taken off; also that where a horizontal supply is taken off the main it leaves it on the top. A separate pipe is run from the first connection over the boiler direct to the expansion-tank, adding materially to the effectiveness of a low-temperature apparatus. No endeavor has been made to indicate a model heating apparatus by these drawings, but simply to show what experience has proved to be a proper method of connecting a hot-water boiler with radiation to give an effective and even heat.

American vs. English Locomotive Building.

A correspondent of *Engineering* (London) states that "in ordering English locomotives colonial engineers require specifications, followed by careful inspection and examination, of all engines supplied from England, while the same engineers will buy engines from America without specification or inspection." The same correspondent also adds: "Why is it that every English railway must have a class of its own, and these often designed by ignoramuses for cranks; consequence is English locomotive builders cannot build engines to stock, American builders, on the other hand, work on stock and especially in slack times; and, being able to order the materials they require without consulting any one, they can keep their men and tools more constantly employed and work cheaper and better." In concluding his letter this writer says: "Of the 12,000 engines on English railways at £400 each, £4,800,000 would have been saved on their original cost had they been made in America. Taking the annual mileage of each engine at 25,000 miles, and the life of an engine 500,000 miles, thus to keep up the stock the English railways require to build 620 new engines a year. Were they to get them built in America they would save £248,000 a year, a consideration certainly in these dull times."

A Radial Arm Drilling Machine.

An interesting machine tool intended for some public works in China has recently been built by G. F. Smith, of Halifax. It is a large radial drilling machine. The main standard for carrying the arm is fitted and bolted on a strong base plate, 13 feet long and 5 feet wide, and is fitted with longitudinal T-grooves for bolting the work down. The arm is raised and lowered by power readily applied by lever when the drill is in motion. The drill head is adjustable on the arm, and there is a self-acting feed to the spindle. The radius of the arm is 8½ feet, and the clear height under the spindle to top of base plate is 8 feet. The vertical traverse of the arm is 3½ feet. The drill head is adjustable on the arm 5½ feet, and the spindle has a self-acting feed of 2 feet. An arm bracket cast to the standard carries the driving cone and gearing. This arm has a radius of 100°, and is traversed vertically self-acting by means of a wrought-iron clutch fitted inside the main standard. This clutch is operated by a lever placed in a convenient position outside the standard, so that the motion of raising or lowering the arm can be quickly reversed. The drill head is traversed along the arm slide by a rack and pinion with a hand-wheel variable feed motion to the spindle. The latter works in a barrel with parallel and conical adjustable bearings to keep the spindle perfectly true. There is a screw feed to the spindle, provided with hardened steel washers to resist the back pressure of the cut, and lock nuts to take up back lash and prevent the spindle falling by its own gravity. The machine weighs 11½ tons, and is the largest radial drilling machine ever made in Halifax.

Horizontal Windmills.

Sir William Fairbairn, in his "Treatise on Mills and Millwork," gives the following interesting account of a horizontal windmill at Eupatoria, in the Crimea, as it appeared to him during the period of the Crimean war:

Around the town of Eupatoria, in the Crimea, there appeared to be nearly 200 windmills, chiefly employed in grinding corn, and all which were in a workable state were of the vertical construction, and only one horizontal mill, which seemed to have been out of use for at least a quarter of a century. The tower of this mill was built of brickwork, about 20 feet diameter at the base and about 17 feet at the top, and 20 feet high. The revolving wings, which consisted of six sets of arms, appeared to be about 20 feet diameter and about 6 feet broad, fitted with vertical shutters, which were movable on pivots passing through the arms, the shutters being about 12 inches wide by 5 or 6 feet high, and the pivots were fixed at about one-third of the breadth from the edge of the shutters, in order that the wind might open and shut them at the proper time during the revolution of the wings. About one-third of the circumference of the wings was surrounded by a segmental screen to shelter the arms and shutters while moving up against the wind, and the screen seemed to have been hauled round with ropes in order to suit the direction of the wind.

Rolling Window Glass.—A proposed method for making window glass by rolling instead of blowing has been described recently in the *Pittsburgh papers* and commented upon at some length. Though the description of the process is not very clear, it would seem as if the intention of the inventor is to run the molten glass as it comes from the pot between two hollow reversible rolls heated by natural gas by pipes full of perforations placed on the inside of the rolls. As the rolled glass passes through the rolls it is received on the opposite side on an iron plate, also heated, from which it is passed into the annealing furnace. If it is claimed that by this process a glass of uniform thickness and polished ready for the sash can be made we are inclined to question the claim. If the temperature of the rolls should be any less than that of the glass when it strikes it will chill the surface of the glass at once, and it will lose its viscosity and malleability, the properties upon which the process would depend; while, were the rolls heated as high as the glass, they would be of little or no value. It is also well known that glass by touching iron loses a part of its polish, and this must be restored by "skin melting" the glass, or by polishing it as plate glass is polished.

Swedish Guns.—At a recent trial of a 15-cwt. breech-loading gun manufactured at Finspong, in Sweden, the gun is said to have equalled the famous Krupp guns, both in accuracy and effectiveness. The trial took place at the artillery grounds of the Danish Army, near Copenhagen, and as a result of the trial several more guns have been ordered from the same place. It is stated that these Swedish guns are much cheaper than German ones.

Induced Versus Forced Draft for Marine Boilers.*

This paper is intended to bring before the society the subjects of induced and forced draft for increasing the efficiency of marine boilers. Forced air and closed stokeholds have of late been brought into use and largely adopted for naval purposes, and it is but reasonable to suppose that much valuable information has been obtained by the steam department of the navy. By the introduction of iron and steel for shipbuilding, both the speed and tonnage of ships have increased considerably; improvements in marine engines have also received great attention, but the same cannot be said of the boilers upon which their success depends. They have been allowed to remain much as they were 40 years ago, and so long as space could be found for them they were not considered. It was to meet the requirements of the navy that attempts were made to increase the efficiency of steam generation by artificial means. This being a new departure it has caused great interest to be taken in it. The capabilities of fans for blowing or forcing fires have been known for years, but in adopting them for forcing air to marine boiler furnaces it was found necessary to close the stokeholds and make air-tight for entrances, so that the outlets should be through the fires, the pressure of air being regulated by the speed of the fans. The furnaces being no longer dependent on natural draft could be forced and the rate of evaporation increased at will. To consume 15 pounds of coal per square foot of grate per hour with natural draft is considered high, yet it is stated that 100 pounds have been achieved by the forced-air system, a rate that would greatly tax the capabilities of the stokers and the boilers also.

Forced air having been brought into requisition for marine boilers opens up a wide field for discussion, especially as both mechanical and chemical laws are involved in it. The problem is how to make coals produce their maximum effect. So long as marine boilers had to depend upon natural draft for a supply of air to the furnaces only a fixed duty could be obtained from the coal. To produce higher rates mechanical devices have to be employed. The vital question which arises as to what quantity of air is requisite per pound of coal to burn it usefully has not, as a rule, been taken account of in official trials. The chief points taken in them for measuring results are the weight of coal consumed per square foot of fire-grate and the indicated horse-power per hour. As the results are so different with various boilers, it shows that some more definite data are needed. The rate of coal consumption will not define the indicated horse-power per foot of fire-grate on the forced-air system. The rate in H. M. S. Polyphemus is: Coal 48.14 pounds per square foot of grate per hour; the indicated horse-power per square foot of grate, 15.63; while in the Howe the consumption is only 33.47 pounds to do the same duty, a difference of 14.37 pounds, clearly showing that some means are needed for regulating the rate of combustion. It is quite understood that economy has not been considered in adopting the system for naval purposes; these high rates are only intended for short runs. It is well known that considerable difficulties were experienced on its first application. In the case of the Polyphemus it involved the whole set of 12 boilers. Well made as they were, they could not be made to stand forced air, and they had to be removed and replaced by others of a different class. These boilers were of the locomotive form, and if they had been worked on the locomotive principle would have been excellent steam generators. The locomotive is the highest example known for rapid steaming, due to the blast-pipe in the funnel producing induced draft and high temperature in the furnace; its full force can be used without injury to either boiler or tubes. The heat is drawn in regularly through the full length of the tubes as fast as it is generated; there is no delay or storing in the fire-box or trouble with priming. Reverse the process by forcing air to the furnace; the result would be to convert the furnace into a battery, and the tube plate into a target exposed to the full force of the heat generated. The resistance in the tubes also having to be overcome would cause the heat to impinge severely on their orifices. So with marine boilers. It is the tube plate which suffers most, as there is a constant pressure against it according to the force of air supplied.

There has been so much trouble experienced with boilers upon the forced-air system that numerous devices have been resorted to in order to obviate them. The combustion chambers have been made longer than usual, and the tube plate placed further from the furnace. In some of the French gunboat boilers an inverted brick partition has been built in the combustion chamber in order to break the initial effect of the heat. By forcing air through the fire a constant shower of dust and cinders is blown into the tubes and smoke-box, and large quantities up the funnel. So much trouble has been caused by this that in most cases the pressure of air has been reduced considerably. Whatever might be said in favor of closed stokeholds, there is a feeling of insecurity in being shut up with boilers, with only air-locks for escape if anything happens. There are no records of prolonged steaming at full speed, neither does that appear possible on this system, or that it can be made suitable for merchant ships.

Induced air by mechanical means for increasing the efficiency of combustion is an old idea, and was tried on land boilers before 1854, and more recently on marine boilers. It has been tried on the torpedo-boat Vesuvius, and it is stated that the results were unfavorable, but this may have been due to the defects in the arrangements, as the means employed for forcing are equally available for inducing air if properly adapted to the service required. The solution of the problem of obtaining increased draft without the destructive effects and the dangers of the forced-air system is, in the author's opinion, to place the fan at the extreme exit

of the furnace, and exhaust by its means, instead of placing it in the stokehold at the furnace entrance and blowing into it. The appliance by which the author accomplishes this result consists of a pair of fans placed in the base of the funnel, one on each side of the uptake, and mounted on a shaft carried through the uptake in an iron casing. The uptake is fitted with a damper, which is open when steaming with a natural draft. On closing the damper, however, the products of combustion coming through the boiler tubes into the uptake are deflected through the fans and follow the course indicated by the arrows. The high speed imparted to them by the fans induces a correspondingly accelerated draft through the whole of the tubes and furnace passages. It will thus be seen that the draft is entirely independent of the height of the funnel, which, indeed, may be dispensed with altogether.

To test the practicability of this the author obtained a marine boiler of modern construction and set it up in his factory, so that it might be worked on the same conditions as in a vessel, and extended trials made without interruption. The results have shown that the duration of steaming with induced air may be continued indefinitely or for the longest voyage a ship can make. The following are the particulars and dimensions of the experimental boiler and fans. The fans used have flat blades.

	Feet.	Inches.
Steel marine boiler—Length.....	6	0
Diameter.....	5	6
Single flue—Diameter.....	2	3
Tubes No. 44—Length.....	4	6
Diameter.....	2 3/4	
Area of fire-grate.....	6.75	square feet
Heating surface:		
Tubes.....	97	square feet
Furnace.....	17	square feet
Combustion chamber.....	38	square feet
Total.....	152	square feet
Heating surface per square foot of fire-grate.....	22.5	square feet
Fans—Diameter.....	12	Inches.
Diameter of inlet.....	12	
Revolutions per minute, 1,150.		

In the boiler of a French gunboat designed for working by forced air, an inverted arch has been introduced in the center of the combustion chamber. This addition has been found to be absolutely necessary to moderate the destructive action of the fire when driven by the blast from the fans direct upon the tube plate. The accumulated pressure in the combustion chamber, as it endeavors to force its way into the tubes against the resistance of the gases in them, acts most violently on the orifices of the tubes themselves, soon causing leakage. It must be remembered that the pressure of blast from the fans is constant, while the condition of the furnace, as to its power of usefully taking up the forced air, is always changing by the burning of the fuel, and not only is this the case generally over the fire-grate before and after a charge, but at any one time the condition of the fire-grate at various parts differs greatly, some portion or other being always more or less bare of fuel. Again, as so much more coal is consumed on this system, the disturbance due to the opening of the fire doors is greatly aggravated, and with the increased coal a corresponding increase of clinker is deposited on the fire-bars, rapidly closing the air entrances, so that the combustion is chiefly on the surface of the bars instead of on the surface of the fuel.

A larger proportion than usual is given by the author to the inlet of the fan for the induced draft. This is required on account of the expansion of the gases rendering larger inlets necessary than are required for cold air. Provision is also made for preventing the shaft which passes across the uptake from transmitting the heat it may there acquire to the bearings at either end. Not only is the center portion of the shaft protected by a sleeve, but it is not made continuous through to the bearings, but a pair of hollow couplings are interposed between it and the bearings, by means of which continuity of temperature is broken, and the bearings are found to run perfectly cool. The driving gear was also an important question. Special trials were made in October last to test the capabilities of that adopted for driving a pair of 3 foot fans. These experiments were witnessed by several engineers and by an inspector from the Admiralty. The force on the inlet side indicated 15 pounds per square foot over a 4-foot funnel, after which it was run daily to test endurance. Brake-power was also applied to the fan-shaft in addition to the fans, yet no slip could be detected or any perceptible wear, and as the wheels run in the same direction the friction is reduced to a minimum. The experimental boiler was put down early in March, and has since then been daily at work supplying the steam for the author's works, thus affording daily opportunity of trying various experiments, the fans having been fixed from the first as a permanent thing. Special apparatus has been in use during the experiments for taking the temperature at various points, measuring the cubic feet of water evaporated per pound of coal and per foot of fire-grate. The author considers that these latter are more certain indications of efficiency than the horse-power per foot of grate which is usually recorded.

In comparing the three systems of ordinary forced draft, the French boiler and the author's induced draft, it is necessary to say that the temperature and draft have not been given for the forced-draft boiler, because no information on the subject is obtainable. It may, however, be noted that in Mr. F. C. Marshall's boiler trials of 1 1/2 hours with forced draft he records temperatures averaging for the stokehold 76.50° and for the uptake 118.50°. In this case also the water was taken per pound of coal as 8.56 pounds, from and at 212°, and coals per square foot of grate at 118.1 pounds. Compare these with the results obtained by induced draft—a temperature in the uptake of 450°, and water 12.25 pounds per pound of coal, and 21.92 pounds of coal per square foot of grate. The enormous temperature in the uptake under the forced-air system is of the highest importance, not only on account of its danger, but as proving how little duty had been extracted from the coals, and thus accounting for the enormous consumption of coals per foot of grate, which must have taxed the efforts of the firemen to the ut-

most. To the same cause is to be attributed the vast quantity of dust and cinders blown into the tubes and smoke-box, and thence upon the funnel, which is one of the troubles of the forced-draft system. Hence it can only be used for short spurts of a few hours, as is admitted by the Admiralty authorities. How impossible it will be to use it for merchant service on long voyages is evident.

It is remarkable that, while the forced-air system results in diminishing economy as the blast is raised, and there is a maximum pressure after which it is difficult to work at all, the induced air, on the contrary, gives an increase of results and economy from increased draft, with no limit but the convenience of obtaining high speed of fan. The gases being drawn through the tubes instead of forced are properly consumed, and there is no discharge of ashes through the tubes. So complete is the combustion that, to the author's surprise, the quantity of coal used does not increase at anything like the proportion of the increased efficiency. The annexed table shows respectively the results of full-speed trials with natural draft and induced draft:

TABLE I.—Natural Draft on Full-Speed Trials.

	H. M. S. Triumph.	H. M. S. Grinder.	H. M. S. Bonadice.	H. M. S. Sultan.	Marine boiler at dockyard.
Air consumed per pound of coal.....	192.51	167.42	264		870.64
Air consumed per sq. foot of fire-grate per minute.....	86.7	30.7	86.88		94.61
Pounds of coal consumed per sq. ft. of fire-grate.....	27.053	10.96	19.74		15.28
Temperature in furnace.....	1,834°	1,800°	1,850°	1,862°	
Temperature in tubes.....	600°	442°	736°		
Temperature in smoke-box.....	736°	700°	700°	736°	
Temperature in funnel.....	736°	700°	800°	810°	
Pounds of water evaporated per lb. of coal at temperature of feed 212°.....					10.8
Temperature of feed-water.....					50°

TABLE II.—Induced Draft on Full-Speed Trial.

Air consumed per pound of coal.....	354 cubic feet
Air consumed square feet of fire-grate per minute.....	130 cubic feet
Coal consumed per square foot of fire-grate per hour.....	21.92 pounds
Water evaporated per pound of coal at temperature of feed 212°.....	12.25 pounds
Water evaporated per square foot of fire-grate.....	268 pounds
Mean pressure of steam in boiler.....	76 pounds
Temperature in combustion chamber.....	1,800°
Temperature of feed-water.....	54°
Diameter of fans.....	34 inches.
Revolutions of fans per minute.....	1,150
Temperature at discharge from fans.....	450°

In conclusion, the author is desirous of drawing the earnest attention of engineers to the necessity of balancing the supply of air to the quantity of coals to be consumed. Without attention to this, both economy and efficiency are sacrificed. If too little air is supplied the gases pass off unconsumed, and if too much is forced in the gases are driven off before they have time to be consumed, fuel is wasted and the temperature lowered.

Coal in Ohio.

In his report on the coal mines of Ohio Thomas B. Bancroft says: "The record of improvement in the mines of the State during the past year has kept pace with that of the preceding year, notwithstanding the adverse condition of the trade. During prosperous periods and when operators are realizing a fair profit upon their output it is much easier to secure needed improvement in mines than during seasons of depression, when a hand-to-mouth policy is forced upon the owners and the necessary expense attending a full and proper improvement becomes burdensome." The inspector then goes on to say that "the condition of the coal trade during the past year is by no means satisfactory." He thinks that the discovery of natural gas at Pittsburgh and elsewhere has had a depressing effect upon the coal trade in Ohio, that discovery alone having crowded from the Pittsburgh market at least 20,000 tons per day. The report says that during the year 26 mines have been worked out or abandoned and 28 new mines have been opened in the State. The year closes with 344 mines, each employing 10 or more men, and 214 small mines, the latter being principally in the counties of Muskingum, Columbiana and Lawrence. Muskingum has the largest number of mines, but Perry employs the most men.

According to this report there are 17,734 miners employed in the 25 coal-producing counties in the State, and the average time made by each miner during the year was 201 days, an increase of 2 days over 1884. The mines that employed 10 men and upward produced a tonnage of 7,816,179, and of this amount 6,635,029 was lump and 1,181,150 was nut. Perry County produces about 16 per cent. of the coal mined in the State, while more than 35 per cent. of the total output comes from the Hocking Valley region, comprising the counties of Athens, Hocking and Perry. The counties of Tuscarawas, Stark, Summit, Wayne and Medina produce over 13 per cent. of the whole, while Jackson and Belmont produce 10 and 9 1/2 per cent. respectively of the whole. In spite of the depressed condition of the iron trade the quantity of iron ore brought to surface was only 16,705 tons less than in 1884. The following is a statement of the product of the different counties:

	Blackband.	Hematite.
Lawrence.....	82,691	64,136
Jackson.....	14,122	12,842
Columbiana.....	11,700	8,086
Scioto.....	119	
Perry.....	38,250	
Vinton.....	30,000	
Gallia.....	12,685	
Tuscarawas.....		
Mahoning.....		
Trumbull.....		
Total.....	70,935	198,646

There were also mined in Ohio, for flux, 141,957 tons of limestone.

* The flue of this boiler led into the factory stack, producing furnace draft at the rate of 900 feet per minute.



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THE WEEK.

The Glass Blowers' League having taken action opposed to the employment of apprentices, the Glass Manufacturers' Association at its semi-annual meeting, held in Long Branch last week, passed a resolution declaring that such action is arbitrary and opposed to the interests of all concerned, and suggesting the expediency of establishing a training school for glass blowers.

The Berlin National Industrial Exhibition scheme threatens to collapse. As many of the chief German manufacturers oppose the project the Federal Council decline to grant the required subsidy of £120,000.

A cable to Brazil complete and in working order by January next is promised by a company just organized, with H. K. Thurber as president. The cable will go from the United States to Hayti, thence to Curacao, and from there along the Venezuelan coast to Cayenne, in French Guiana. From there the cable will be continued to Para, where it will communicate with the Government land lines of Brazil.

A boiler which exploded in the shop of Joseph Fassett, Wellville, Ohio, caused the death of two little children. The cone, weighing a ton, was thrown 300 feet in the air and fell some distance from the factory.

According to carefully prepared statistics the sugar crop of Cuba this past season amounted to 690,779 tons, against 631,967 tons the previous year. Profits will be seriously affected by the prevailing low prices.

The value of French imports during the last six months decreased 23,000,000 francs, while the exports increased 42,000,000 francs. The Treasury receipts fell off heavily, chiefly in consequence of losses in the revenue from sugar duties.

The United States marshal in Richmond, Va., on Thursday served notice on the officers of the Richmond Typographical Union and the editor of the *Labor Herald* of that city, prohibiting them from publishing in that paper or elsewhere the names of persons who are patrons of a boycotted firm in Richmond which employs non-union printers. Judge H. L. Bond, of the United States Court, issued the order in Baltimore the previous day. The order prohibits the persons enjoined from advising or inducing, publicly or privately, others to boycott the firm. This order of Judge Bond's is the most far-reaching ever issued in the direction of preventing the boycott.

A movement has been inaugurated for the establishment of a large cotton market at Bremen to enable German consumers to draw their supplies thence instead of from Liverpool and Havre, as at present.

The chief of the Bureau of Statistics reports that the total number of immigrants arrived at the ports of the United States from the principal foreign countries during the 12 months ended June 30th ult. was 328,917; for the previous year, 349,000.

The French Admiral Lafont, in a statement made before the Chamber of Deputies, boasts respecting the condition of the navy that in case of war he should have no doubt of success, "even though the war were directed against Great Britain."

The Plymouth County jail, in Massachusetts, is boycotted, or rather the contractors who agreed to furnish materials for the employment of prison labor, they being unable either to dispose of the manufactured products or to obtain transportation.

Traffic on the Lake Superior ship canal is this season larger than ever before. The report for June shows that the aggregate registered tonnage passed through the locks was 672,008 tons, and the amount of freight transported was 668,417 tons. The registered tonnage exceeded that of the corresponding month last year by 191,676 tons, and the freight tonnage by 156,167 tons.

King Kalakaua, of the Hawaiian Islands, is not, according to accounts lately received, a successful ruler. His weakness is said to be of a pecuniary nature, not to speak of other failings. A correspondent who relies for his statements upon an official who spent many years on the islands, says: "The man who is credited with the greatest influence over Kalakaua is Walter M. Gibson, the Prime Minister. Gibson is an adventurer of the type often found in the South Sea Islands. He is an American, who, while in Batavia many years ago, came near involving the Dutch Government in a war with the United States. In 1852, while in Sumatra, he instigated a rebellion against British rule, and was forced to fly under cloud of night. Mormonism was then looming up, and after he reached New York he went out to Salt Lake and cast in his fortunes with Brigham Young. It had been one of Brigham's dreams to found a strong Mormon colony on the Sandwich Islands, as a refuge to which the persecuted saints could flee should they ever be driven from Utah. In Gibson he found a man after his own heart, and Gibson was accordingly sent out to Honolulu to found the settlement. He converted a large number of natives, charging commission of \$5 per head, and religiously gathered in the tithes for the church, but, like Sam Brannan in California, he never earned over the coin to Brigham. With the

proceeds of his enterprise he bought a large tract of land on the Island of Lanai, and planted it to sugar. He added to his original possessions many thousands of acres of crown lands, which he holds under a 20 years' lease from Kalakaua at a merely nominal rental. Ever since Kalakaua was made King he has been the power behind the throne, but of late years he has thrown off all disguise of secrecy, and he now holds a half-dozen lucrative offices, and is the real governing power."

The total export of white-pine lumber from the port of New York, reported by the New York Export Lumber Company, for the six months ending June 30, 1886, was 22,794,000 feet, against 32,794,000 feet in 1885 and 34,873,000 feet in 1884.

The discussion of the apprenticeship system in the master painters' convention, held in Philadelphia last week, presented several interesting phases. The subject of grading workmen was treated in a paper read by B. S. Mills, of Chicago, and J. G. McCarthy, also of Chicago, advocated the use of cards of proficiency, which was agreed to. John Pattenon, of Philadelphia, argued that nothing would benefit the association like the apprenticeship system. A motion was adopted to make the term of apprentices' service five years. A discussion of the benefits to be derived from the establishing of trades schools followed. A. A. Scheidler, of New York, said the great and important question is how we can make skilled mechanics outside of a State prison. Ought not Congress to be called upon to do something about this? He asked and urged that a committee be appointed to confer with other trade associations throughout the country to get concerted action. Technical departments could be attached to our ordinary schools, but the instructors should be skilled artisans. The convention agreed that trade schools should be established and that the organization should lend all its influence to that end.

District No. 30 of the Knights of Labor comprises the city of Worcester, Mass., the largest district in the country, there being a membership of 110,000, and the newly appointed master workman is Chas. H. Litchman. In his report just presented Mr. Litchman disparages strikes and pleads for arbitration, but still adheres to the right of the workers to strike, because otherwise the employers would refuse to arbitrate. The report indorses the principle of profit-sharing and co-operation. "The order is higher and better than a political party and the parent of political principles, but it is only through political action that their declaration of principles and their preamble can be formulated into law." He warns them against political hacks who seek to join the order for selfish ends.

The Ferdinand Remys mill for the manufacture of rolled iron, in Dortmund, Westphalia, has suspended operations \$300,000 in arrears, which the establishment is unable to meet. The suspension is attributed to the stagnation in the Rhenish and Westphalian iron trade and the success of English competition.

Bids for the enlargement of the Museum of Art will be opened August 28. By making certain changes in the specifications, such as substituting galvanized iron for copper in the roofing, it is thought that the cost of the work will be reduced about \$40,000, and that the amount of the contract will be within the \$300,000 allowed by the appropriation.

Another large silk mill is about being moved from Paterson, N. J., to Harrisburg, Pa., according to the *Guardian*. The principal cause assigned for this, as for other like movements, is the constantly recurring labor troubles which the manufacturers are anxious to escape.

Importers of textiles advise jobbers to make a quick delivery of goods on hand, to take advantage of the present low rates of freight, also to prepare for an early fall trade.

The hop crop in the State of New York this season is estimated at not more than half the usual average. The normal yield of this State is about 190,000 bales, and that of the whole country, including the Pacific Coast, only about 280,000 bales.

Fears of the California vintage are said to be groundless, a crop above the average being confidently looked for.

A tunnel nearly 1200 feet in length is being constructed in Philadelphia for the new line of the Baltimore and Ohio Railroad. For 475 feet at the southern end the arching will be constructed of iron girders and riveted steel plates, upon which will be formed a surface layer of asphalt. The next hundred feet, owing to higher ground, will be of brickwork, and this will be succeeded by ironwork, as in the first sub-section. The ironwork is done by Frederick Smyth, of Baltimore.

An explosion of malt dust in Ehret's brewery set the building on fire and caused a loss estimated at \$20,000. Mr. Ehret says: "Our millwright, Charles Stoll, has been investigating the cause of the fire. At first he believed a pebble had got into the malt, been carried along with it to the steel rollers, where the malt is crushed, and there struck fire on account of the great friction.

He has now made up his mind that the fire was caused by ignition—possibly spontaneous—of the very fine malt dust which collects in the boxes at the foot of the elevators. This dust is very inflammable, and Mr. Stoll has noticed that at times when such dust has taken fire the weather has been hot and the atmosphere heavy. He thinks the electrical condition of the atmosphere may have something to do with it."

The cotton manufacturers of Georgia and South Carolina have organized to resist strikes.

The Massachusetts State Board of Arbitration, as authorized by the new law, consists of Weston Lewis, of Boston, treasurer and manager of a rubber company, and Richard P. Barry, a member of the Knights of Labor, a native of Ireland, but for 33 years a shoe manufacturer in Lynn.

The Savannah steamship *Gate City* ran ashore on Naushon Island, coast of Massachusetts, and was abandoned to the underwriters. Subsequently she was raised by placing canvass under her bottom and pumping the water from her compartments. A large portion of the cargo will be saved and the vessel be placed on dry dock.

The meat-packing firms in Chicago are reported to have formed an alliance for mutual protection and resolved to return to the 10-hour system August 1. If the men refuse to work on the old system, it is asserted that the houses will close and remain closed until their employees come to terms.

The Mormons at Salt Lake contemplate enlarging their system of irrigation by building a third ditch 115 feet above the city, and using two hydraulic rams having a combined capacity of 40,000 gallons each minute to raise the water to the required height, doubling the tillable area of their territory.

The foreign trade in canned goods is rapidly developing on the Pacific Coast and the business promises to reach very large proportions. Orders have been placed in San Francisco recently for shipments to Bangkok, Calcutta, Assam and Australia. The isthmus also is taking large quantities, and the West India and South American trade is constantly growing.

The New York superintendent of buildings submits statistics showing that during the past six months the estimated cost of new edifices of one kind or another for which permits were granted on Manhattan Island amounted to \$27,478,858. Of these \$14,420,500 were for five-story flats, \$1,543,500 for factories and workshops, \$1,082,050 for office buildings; places of amusement, \$378,015; churches, \$179,500; hotels and boarding-houses, \$841,000; schoolhouses, \$352,950; tenements under \$15,000, \$3,437,000. Should the same activity continue until the end of December next the amount invested for the entire year in undertakings of this character is estimated at \$74,957,716, or \$29,383,703 in excess of that of 1885.

An industrial exhibition in Newark, N. J., is talked about as an object that should be attained. Since the last exhibition the local population has increased from 110,000 to 160,000, and business interests have increased in proportion. The fact that the city is the seat of two large electrical machinery factories, not to speak of other manufacturing interests represented there in great variety, would be sure to enlist a general interest.

A Pittsburgh manufacturer consumes one carload of lead every week as an ingredient in the production of glass lamp chimneys.

Philadelphia rejoices in the fact that the total imports at this port have increased in value from \$29,019,019 in 1885 to \$36,561,709 in 1886, while the duties collected on imports have increased from \$12,491,513 to \$14,661,896 in the same period. The cost of collection has at the same time been considerably reduced.

The important sense in which the public welfare is dependent on the ability of the United States Treasurer to maintain silver at par appears in recent discussions between Treasury officials and members of the Senate Finance Committee. The bondholders, Assistant Secretary Fairchild said, whether banks or individuals, would probably be the smallest losers by a depreciation of silver, and as a class were better protected and better prepared for the ill effects of bad financial legislation or administration than any other. While the Government was conscious of its obligations to these classes, their protection was a very unimportant element in the opposition to legislation tending to place the Government upon a silver basis. While the loss to these classes from the depreciation of silver could probably be more easily borne or averted, the real cause of anxiety was the serious loss to the people, East and West, North and South, in whose hands the silver dollar circulation is held; the individuals who pay are paid in silver, and whose personal holdings of money and small savings-bank accounts would directly feel the loss from a depreciation of silver. The responsibility which the Government sought by every means in its power to meet was to protect and uphold the value of this coin in the hands of all the people. This was only possible while the two metals were on a par, and that only possible while the Govern-

ment was able to pay either as desired by its creditors. The gravity of the situation, he said, had never been overestimated. The opposition to the surplus resolution was entirely consistent with this anxiety on the part of the Administration. As the Government's product of silver dollars represents a face value more than \$30,000,000 in excess of the purchase price, the Government could not pursue a more honest course toward the people, or take better means of protecting them, than by retaining the difference between this bullion and declared value, in the nature of a trust fund, to guard the holders of the silver dollars from being the losers by the Government's so-called gain.

A Montreal merchant recently returned from the Pacific Coast reports respecting the salmon fisheries that a large business has heretofore been done on Columbia River, but that the salmon are deserting that river, so that the American markets must look to British Columbia for their supplies. The total production of the British Columbia canneries is from 100,000 to 120,000 cases a year, the principal demand for which is from the Eastern States. Were it not for the high duty on tin cans the Canadian Pacific Railway would do a large business in transporting the products of the canneries to the most available markets. The Fraser River canneries are largely owned by Americans.

The Illinois Central shops, in Chicago, have begun work on 10 Mogul freight engines, with 18 x 24 inch cylinders and 56½ inch driving-wheels.

The discovery of rich copper ore in Searcy County, Ark., is reviving a general interest thereabout in copper mining.

A Japanese Prince in New York is the latest foreign novelty. He is said to be chiefly interested in military and naval affairs.

W. C. Lumsden, of the firm of Tappay, Steele & Co., proprietors of a large foundry in Petersburg, Va., met with an accident on Saturday which resulted in his death in a few hours. He had gone over to the yard of the Petersburg and Weldon Railroad to see about the shipment of a carload of iron, and while standing between two cars in conversation with a friend was fatally crushed. Mr. Lumsden was president of the Petersburg Benevolent Mechanics' Association and was widely known at the North.

Experts in the business affirm that an electrical subway adequate to all requirements can be built in New York City for \$4,000,000; that the rentals would be little less than \$1,000,000 per annum, if the law is enforced, while the cost of maintenance would be nominal.

The four massive stone towers supporting the Niagara Suspension Bridge are to be replaced with iron, as the stone masonry is disintegrating. By erecting a temporary framework of iron alongside the towers to receive the cables, it is believed the transfer can be made without much interruption of travel. The cables will first be lifted from their position with hydraulic jacks. The new material is being prepared at iron works in Detroit, and the job is expected to cost about \$40,000.

The exports of petroleum from Philadelphia are unusually heavy. Last week they amounted to 4,628,339 gallons. Since January 1 the exports have been 81,406,304 gallons, while at the same period of 1885 they were but 78,406,719 gallons.

The great plateau between the Rocky Mountains and the Sierra, comprising the Territory of Utah and the State of Nevada, is apparently destined to become the greatest cattle range in the country. Already immense tracts of land, some embracing nearly 250,000 acres, have been purchased, and owners of large herds in Texas and other Southwestern States are looking for ranges in this wide section of natural pasture land. The cattlemen are the natural precursors of small farmers or husbandmen.

Issuing a charter to the National African Company is the last act of Great Britain looking to the extension of its empire. The inevitable effect, it is predicted, will be to make the Niger practically an English river. The capital of the new company is authorized as £1,000,000, and the stockholders are empowered by the charter to hold and retain all "rights, interests, authorities" already acquired or yet to be acquired in the basin of the River Niger.

Commandant McGee, of the Government Ordnance Board, now in charge of the Allegheny arsenal, is of the opinion that only a thrashing by some foreign power will arouse Congress to the necessity of preparing powerful machinery for the manufacture of war appliances suited to coast defense. Private manufacturers are not likely to enlarge their plants to the requisite capacity by erecting hammers, cranes, &c., at all comparable to the enormous tools employed by Armstrong or Krupp or in the French foundry at Cruzat so long as the present uncertainty exists with reference to Government contracts. Commander McGee is of the opinion that if forgings were made by private firms the shops could be utilized to assemble the pieces and give any finishing touches necessary. The Government would be the gainer, however, if all the contracts were let to private concerns.

English Letter.

(From Our Regular Correspondent.)

LONDON, July 12, 1886.

THE SITUATION

may be said to be a trifle better at the moment than it was at the date of my last letter, inasmuch as the elections have made great progress, and there now remain only some 60 members to elect out of a total of 670. As you are well aware by this time, Mr. Gladstone has been handsomely and convincingly beaten all along the line. Under the circumstances, manufacturers (who are largely Conservatives) freely express the hope that the so-called Grand Old Man will retire from politics and save the country from the trouble and expense of disillusioning him further. Quite apart from party politics, I believe I correctly represent the views of many business men in saying that Mr. Gladstone's retirement would be a distinct advantage to our trade, seeing that he is a perpetual dreamer who "dreams dreams and sees visions" which are utterly impracticable and incapable of practical realization so long as he has only weak, ordinary mortals to deal with. Rightly or wrongly, a large section of business men—especially in London—lack enterprise and daring when Mr. Gladstone is in power, simply, they say, because one never knows what he may do at home, while there is the absolute certainty that he will get us into some sort of trouble abroad. Politics, I know, are not the proper food for readers of *The Iron Age*, but I give you what I believe to be the facts, and leave you to draw what inferences you please from them. It is a certainty, at all events, that securities are rising in value as a consequence of the Gladstonian discomfiture. Bank of Ireland stock rose 20 in one day, and most of the Government, railway, &c., stocks have also gone up.

At the quarterly meetings, of which I will give brief reports presently, there was not a great deal of business done, but the tone was not worse, and many merchants, &c., spoke in very hopeful tones of the near future. This hopefulness was emphasized by the issue of the Board of Trade returns for June, showing only a nominal decrease in the value of our imports, while the exports are given at nearly £1,000,000 ahead of the same month of last year. As you will see lower down, a portion of the augmented exports was due to the United States, whence current report says there are numerous orders of late and at present.

The weather has now changed to most welcome rain, which comes too late to damage the hay, but in the nick of time to benefit the garden and field crops. To wheat, oats and barley it is invaluable.

THE IRON MARKET

being still without noteworthy features has been practically relegated to a second place during the elections. Taking all things into consideration, the difficulty with which nominal quotations for special Scotch brands are maintained, and the transactions on a lower basis which are taking place between some second holders and buyers, it is premature to speak of a change for the better, particularly as the attempts recently made to force a revival have signally failed. Moreover, it cannot be overlooked that while the evil day in some quarters has been postponed the aggregate output of iron and the total of stocks are as unsatisfactory as before, and that necessarily until these abnormal conditions are removed a change for the better is improbable. Glasgow warrants have been steady on the whole, closing at 38/8½, with Cleveland No. 3 at from 29/3 to 29/6, according to period of delivery. On the West Coast the position is described as depressing, not because prices have fallen, but because the dullness continues, with but little prospect of revival. Quotations for mixed lots are still nominally at 42/, but the actual selling price is hardly known, each sale being more or less determined by special circumstances. In the manufactured departments the same condition of inactivity can only be chronicled, with rates as before. In galvanized sheets and wire, taken altogether, the volume of business done is a trifle better, but the prices are still very low. For old iron the inquiry is slightly in advance of the last week or two, but, though recent prices still rule, business is not on a wide basis. Freight for pig iron from Glasgow to New York by ordinary steamer continues steady at from 4/6 to 5/-. To Australia the figures remain unaltered, but Tyser & Co. have now fixed the Lurline direct for Melbourne wharf to follow the Dunloe, and in a few days fighting rates are expected to prevail. Steel continues in fair demand, although less business is arising from the inquiries before the market than might be expected. Steel sleepers are less sought after for the time being, and makers with contracts in hand nearing completion are beginning to feel anxious for further work to keep their places going. Steel rails are quiet for the moment, but makers generally report themselves tolerably well employed, although prices are very low. An upward movement is more manifest, and £3. 15/ is being freely mentioned in place of the £3. 10 rate. No fresh inquiry is before the market, save one for 18,000 tons required for the railway in Western Australia, promoted by the West Australian Land Company, Limited.

THE QUARTERLY MEETINGS.

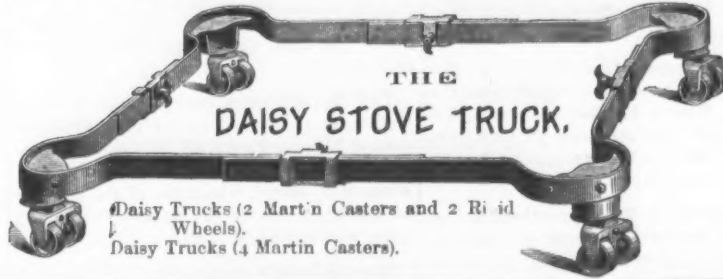
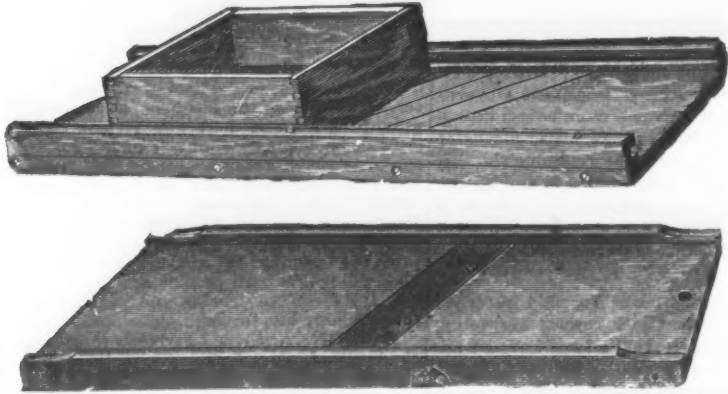
At Middlesboro' on July 6 the attendance was no larger than at the usual weekly markets, and very few strangers put in an appearance. Merchants continue to quote 29/4½ per ton for this month's deliveries of No. 3, G.M.B., and as they find consumers ready to pay the figure they seldom let any iron go at less, though some buyers say they can purchase a little at 29/3. At Wolverhampton on July 7 the meeting was held under circumstances unfavorable to the transaction of any large amount of business. The Lilleshall Iron Company, Shropshire, took the lead in crucial pig-iron quotations by announcing that their price for hot blasts remained at 52/6, with a concession of 2/6 per ton to some buyers. Cold-blast pigs they quoted firm at 75/ per ton. Staffordshire all-

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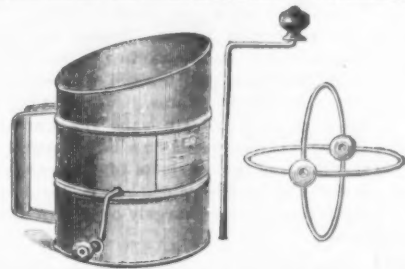
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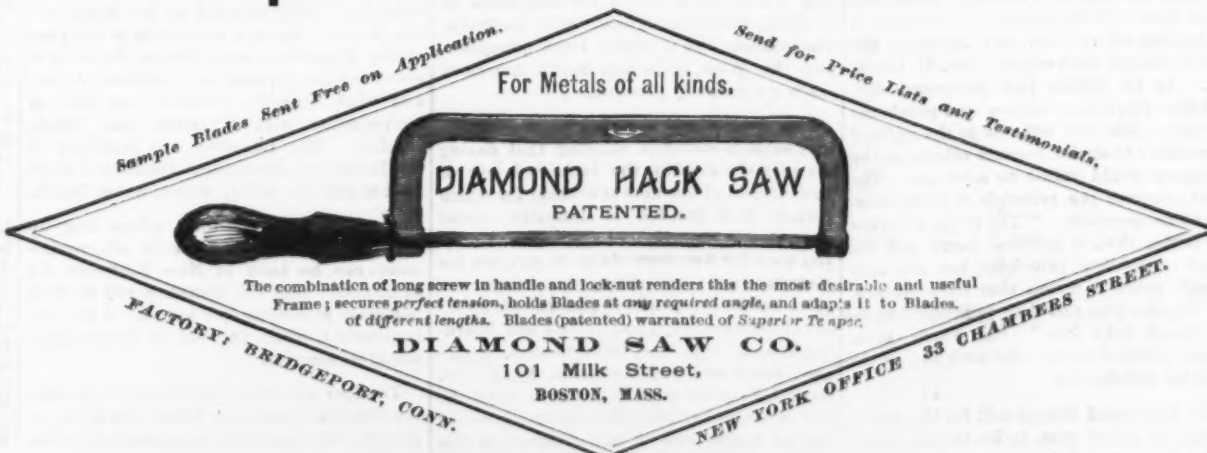
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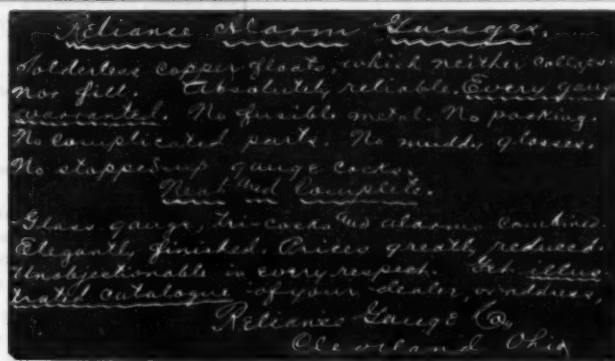
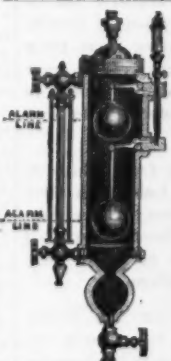
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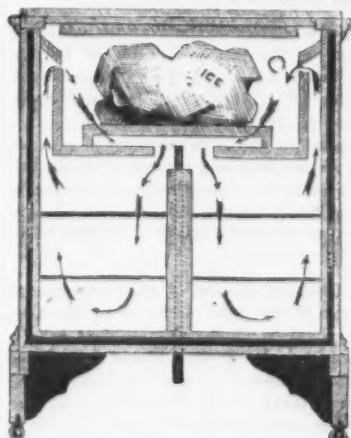


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IMPROVED UNDER PATENTS OF 1875 AND 1876.

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3000 Horse-Power in Progress and for Immediate Delivery. Correspondence Solicited

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SPECIFIED BY ARCHITECTS AND BUILDERS.

We make the broad claim that the PARAGON HANGER is the BEST device for operating sliding doors ever shown to the Trade.

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It is the strongest and most durable, made in one solid piece from air-furnace refined malleable iron (no bolts or rivets to wear and work loose), is the easiest operated, impossible to derail and never requires lubricating, and is by far the handsomest and finest finished Hanger in the market. Using the only polished steel Tee-Rail ever invented. Are made in three sizes (4 to 24 ft. run) for Barn and Warehouse use. No. 4 Parlor Hanger, pat. fiber wheel, absolutely noiseless, cannot wear out. Nos. 5 and 5½ for elevator and small house doors, and No. 6 Car Door Hanger now adopted by the leading railways in the United States.

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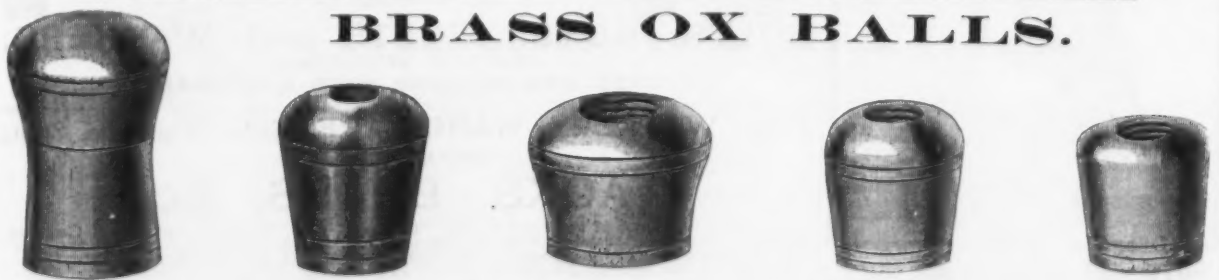
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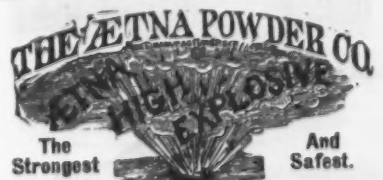
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mine makers followed this lead, though a few declined to sell at anything less than 55¢, and occasionally 57¢. More business proportionately was done in second and third class pigs than in all-mine sorts. Part mines were quoted 35¢ @ 40¢; common foundry, 30¢ @ 32¢, and common forge, 27¢ @ 30¢, which is a reduction upon the price which ruled at the January quarterly meetings of 5¢ 3/4 ton. The Willingsworth make of pigs was quoted 32¢, and Bradley's Darlaston pigs, 35¢. In the finished-iron trade marked bars were redeclared at £7. 12/6 for the Earl of Dudley's make, £7 for the make of the other list houses, while £6 was quoted for second-branded qualities. The reports as to the amount of business doing at the marked iron works were not of a very encouraging character. There was more business doing in second and third class bars. Common bars and hoops showed a reduction on January prices of £5 3/4 ton, the £5 @ £5. 10/ of that earlier period having now become £4. 15/ @ £5. At Birmingham on July 8 the expectations of manufacturers were not pitched very high, and they were therefore not disappointed by the smallness and scarcity of orders for general iron. Production in all departments has been greatly curtailed of late, and during the recent hot weather there was in many mills an absolute suspension of operations. Stocks consequently are bare, and makers are in some cases in arrears with their orders. Galvanizers' sheets were in somewhat better demand in view of the improvement of business in that branch, which is generally attributed to the rise in colonial produce, and especially wool, but, though galvanized sheets ruled 5/ higher, the competition is apparently too keen still to admit of any advance in black sheets. The American demand for scrap iron continues brisk, and both for Canada and the United States there is a large business doing in tin plates, for which the standard quotation now is 13/ for IC coke, or about 3d. less than at the previous quarterly meeting.

SCOTCH PIG IRON

is fairly steady, all things considered, but is generally without special changes to note in respect of values. There is not much business being done in warrants or in makers' brands. There are now 85 furnaces in blast in Scotland, against 91 a year ago. In Connal's stores the stock amounts to 783,888 tons (an addition of 3511 tons last year), as against 601,555 tons this date 1885. Shipments to date are 36,578 tons in arrears, while the importations of Middlesboro' pig iron into Scotland are 25,497 tons in arrears. Current quotations are:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow.	48/	41/
Coltness, "	46/6	43/
Langloan, "	48/	41/
Summerlee, "	45/6	41/
Calder, "	46/	41/
Carnbroe, "	42/	39/6
Clyde, "	42/6	39/6
Monkland, "	39/6	36/
Quarter, "	39/6	35/6
Govan, at Broomielaw.	39/6	36/
Shotts, at Leith.	44/	43/
Carron, at Grangemouth.	47/6	44/6
Kinnell, at Boness.	42/	42/
Glengarnock, at Ardrossan.	42/6	39/6
Eglington, "	39/3	36/3
Dalmellington, "	40/6	38/

MIDDLESBORO' PIG IRON

is very dull, owing to the increase in stocks shown below. Quotations for G. M. B., f.o.b. in Tees, are:

No. 1 Foundry.	No. 2.	Mottled.	White.
2	31/3	28/	27/6
3	29/6	Refined metal.	46/
4	29/	Kentledge.	33/6
4 Forge.	28/6	Cinder.	30/

The official returns of the Cleveland Ironmasters' Association for June give the subjoined particulars: Total make of pig iron, 202,131 tons; stocks, 689,185 tons; shipments, 63,961 tons. There was a decrease of nearly 9000 tons in the make, an increase of some 19,500 tons in stocks and a decrease of some 7000 tons in shipments when compared with May.

HEMATITE PIG IRON

is reported weak and unaltered in some quarters, but I hear of an undercurrent of strength which, if verified, would be likely to harden values before long. Mixed numbers are about 42¢ 3/4 ton, while West Coast makers' brands are:

	No. 1.	No. 2.	No. 3.
Cleator.	42/3	42/	41/9
Lonsdale.	42/	41/9	41/6
West Cumberland.	42/	41/9	41/6
Lowther.	42/	41/9	41/6
Distington.	42/	41/9	41/6
Solway.	42/	41/9	41/6
Maryport.	42/	41/9	41/6
Harrington.	42/6	42/6	41/6

THE BOARD OF TRADE RETURNS

for June show that the total value of our imports was £29,101,941, as against, £29,236,984 in June, 1885—a decrease of £135,043 only. The aggregate value of last month's exports was £18,536,076, compared with £17,717,289, or an increase of £818,787 over the figures for the same month of last year. The quantity of steel and iron of all kinds exported last month was 335,124 tons, of the value of £2,129,939, as against 298,519 tons and £2,026,470 in June, 1885. There was thus an increase of 37,000 tons in quantity, much of which was in respect of pig iron, tin plates, scrap iron and unwrought steel.

TO THE UNITED STATES

the chief items of export were as set forth below:

Articles.	Month of June, 1885.	Month of June, 1886.	Month of May, 1886.
Alkali, cwt.	210,069	199,478	204,884
Hardware and cutlery, £.	35,368	21,587	21,710
Iron—Pig, tons.	36,687	10,374	26,911
Bar, angle, rod, &c., tons.	181	385	283
Railroad, all, tons.	3,284		1,439
Hoops, sheets, plates, &c., tons.	3,926	5,878	672
Tin plates, tons.	31,821	18,181	22,050
Cast or wrought, tons.	97	31	129
Old, tons.	2,506	981	4,571
Steel, unwrought, tons.	4,518	800	3,222
Lead, all sorts, tons.	99	59	1
Steam engines, &c.	3,581	1,971	6,424
Other machinery, &c., £.	45,722	19,807	31,978
Tin, unwrought, cwt.	325	42	919
Special return—Steel rails, tons.	3,184		1,453

THE HARDWARE TRADES.

In London there is little to report specially regarding business in London during the past week. The situation so far as the home trade is concerned remains on the whole

fairly steady—neither worse nor better than it was three weeks ago. At Birmingham business is certainly no worse than before the close of the half year, and in some branches it is decidedly better. Shipping firms predict a considerable revival of colonial and South American trade shortly in consequence of the higher prices realized in this country for produce, and especially wool, and some good orders for heavy hardware have already been secured from colonial firms in London on the strength of the market quotations for produce. Orders are arriving more freely again from the United States and Canada, where a good fall trade is confidently looked for, but none of the Continental markets show much life except Spain. At Sheffield the turn of the half year and the political contest have made the country trade almost a blank during the last week or two, and it is difficult to find any branch of manufacture which is being well sustained by home orders. The United States and Canada after a temporary lull have become fruitful again, and a series of excellent cutlery orders have found their way into the leading establishments. The Ironmonger (London) says: "A local cutlery manufacturer who has just returned from the States has come back with rather gloomy forebodings of the future of the cutlery trade with the Americans, but he finds the immediate consumption satisfactory enough, and anticipates a tolerably large fall trade this year."

TIN PLATES.

In London the market is steady, and without noticeable change in the position from that noted in my last report. I quote good ordinary IC cokes 13/9, f.o.b. Liverpool. At Liverpool there would have been more business done if makers were disposed to book lines for forward delivery at 13/6 IC for coke tins and Bessemer steels, also Siemens steels at 6d, or so more than Ressemer. But they hesitate to commit themselves to such an extent in the face of an advancing tin market. The inquiries for charcoal tins and ternes are not by any means numerous. There is plenty of room for improvement in both of these as regards the demand and price. The prices for the various grades of charcoal tins seems to have settled down to 14/6 and on to 15/6 IC, and best charcoal tins 16/ @ 17/ IC. The large number of ternes that are now offering tends to keep the prices of those still at a low level, and 12/6 @ 13/6 IC is the general figure, though some few of the better class brands command 14/ @ 14/6 IC. Coke tin wasters are in good demand at 12/6 and 12/9 for Bessemer.

Trouble in the Rensselaer Rail Mills Settled.

The New York State Board of Arbitration have decided the controversy in the Rensselaer Rail Mills of the Troy Steel and Iron Company. The heaters and helpers presented the following grievances:

1. Assistant heaters request an increase from 12 cents to 16 cents per ton for hot steel, and from 12 to 20 cents per ton for cold steel. The heaters request an increase from 10 to 13 cents per ton for hot steel, and from 10 to 16 cents per ton for cold steel.

2. We request that the Troy Steel and Iron Company pay us our wages semi-monthly instead of monthly.

3. We request that the company provide a suitable place for men to wash and change their clothing.

4. We request that the gates be left open during working hours for the free ingress and egress of employees.

The conclusions and recommendations of the Board of Arbitration accepted by the Troy Steel and Iron Company are as follows:

1. That the assistant heaters shall receive an advance from 12 cents, the present price, to 14 cents per ton on hot steel, and from 12 to 15 cents on cold steel. That heaters should receive an advance from 10 cents, the present price, to 12 cents on hot steel, and from 10 to 13 cents on cold steel.

2. While the board are of the opinion that as a general principle wage earners should receive frequent payments of money due them, their judgment is, upon the evidence submitted, that semi-monthly payments are not expedient in this case.

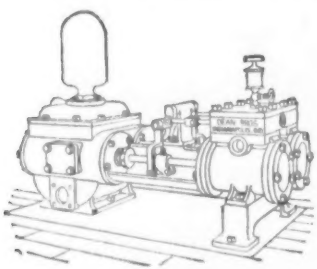
3. It is recommended that the company provide for employees suitable cover and facilities for washing and changing their clothing.

4. Upon the evidence given the board are of the opinion that the gates are kept open for the ample accommodation of employees, and that a continuance of the same hours ought to be satisfactory.

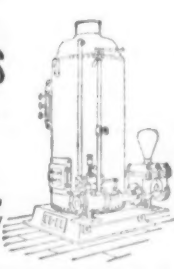
Hall & Carpenter, Philadelphia, have recently issued an advertisement of Hall's G. D. C. IC Ternes, in the shape of a miniature edition of a box of this brand of roofing plates. The box measures about 4 x 3 inches, and appears to be made of elm, which we suppose has done previous duty as a casing for full-grown plates. The boards of top and bottom are separated in the regulation manner, so as to expose a strip of tin plate between. The sides of the boxes are branded as follows: "Hall & Carpenter," "Guaranteed Double Coated," "Hall's G. D. C. Ternes IC" and "Best Best Charcoal." Viewed from either an aesthetic or an utilitarian standpoint this embryo box of plates is a decided success, for artistically it is an excellent reduction of a large-sized box, and, further, it will prove very useful as a paper-weight.

Through an oversight in our last issue we failed to credit Mr. Oberlin Smith, of Bridgeport, N. J., with the authorship of the paper entitled "Inventory Valuation of Machinery Plant." The paper, as we remarked, was presented at the last meeting of the American Society of Mechanical Engineers.

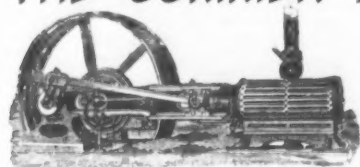
M. P. Andoin, writes to the Revue Industrielle claiming priority of invention on the use of chrome ore as furnace lining. He states that he exhibited chrome brick at the 1878 Paris exhibition, and also showed a St. Claire Deville furnace in which he had melted several hundred grams of platinum without affecting the furnace.



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INDEANAPOLIS, INDEANA.
 Boiler Feeders, Fire Pumps, and Pumping Machinery for all Purposes.
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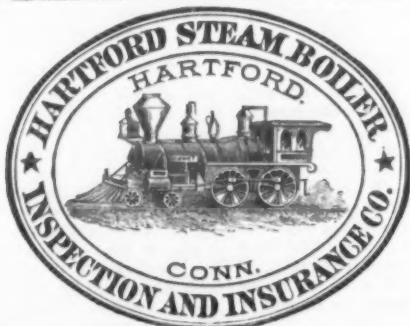


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ALSO COVERING LOSS OF LIFE AND ACCIDENT TO PERSONS, ARISING FROM

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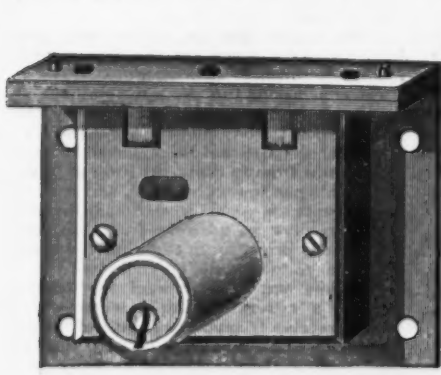
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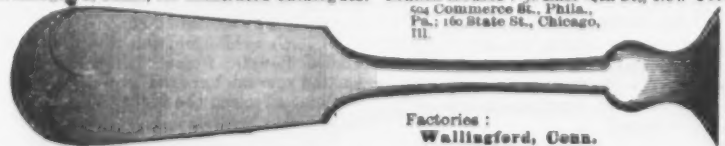
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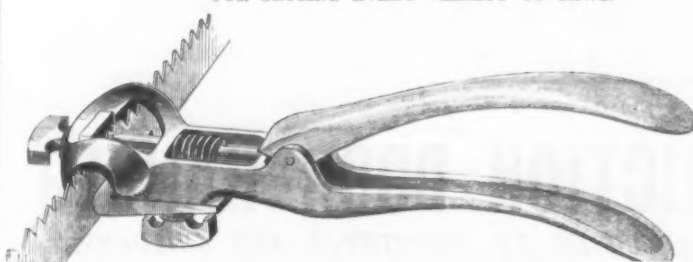


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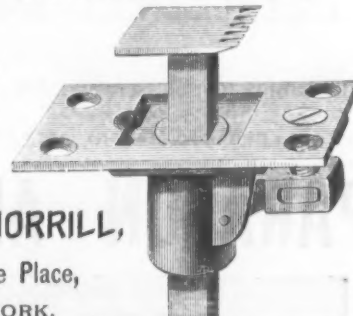
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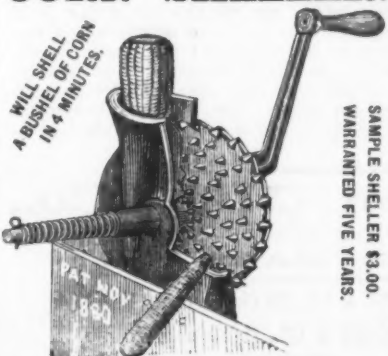


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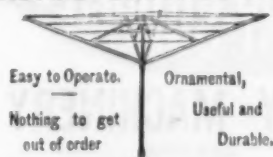
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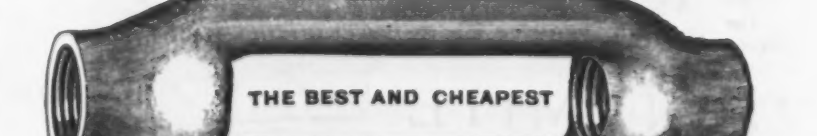
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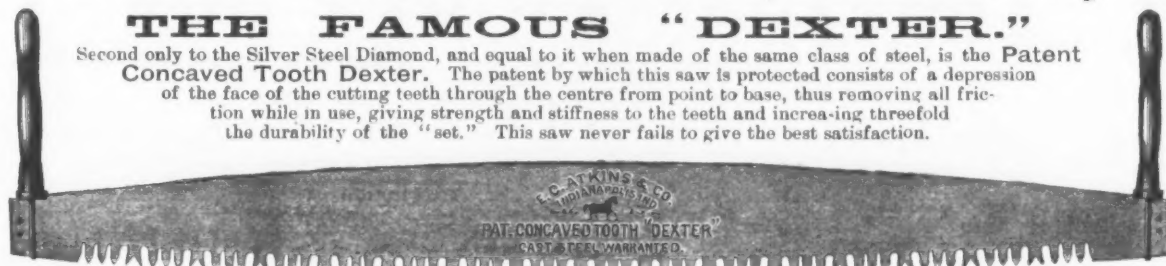
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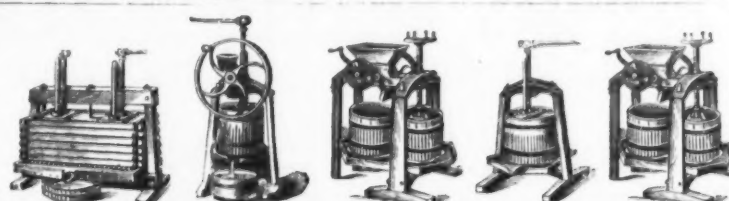
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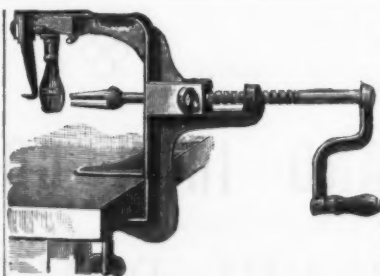


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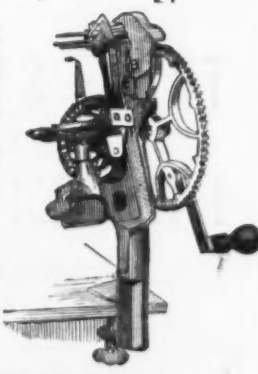
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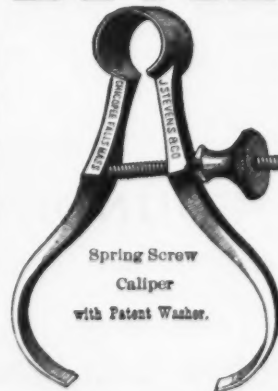
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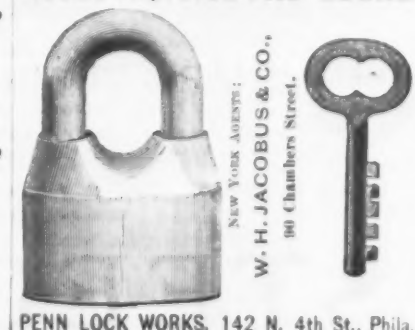
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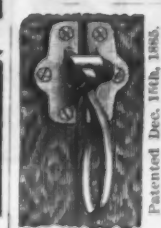
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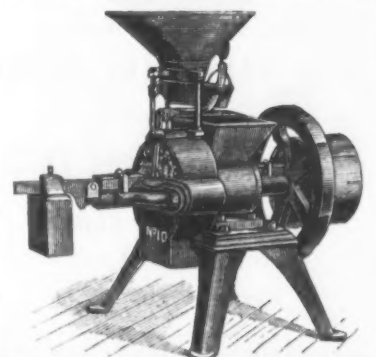
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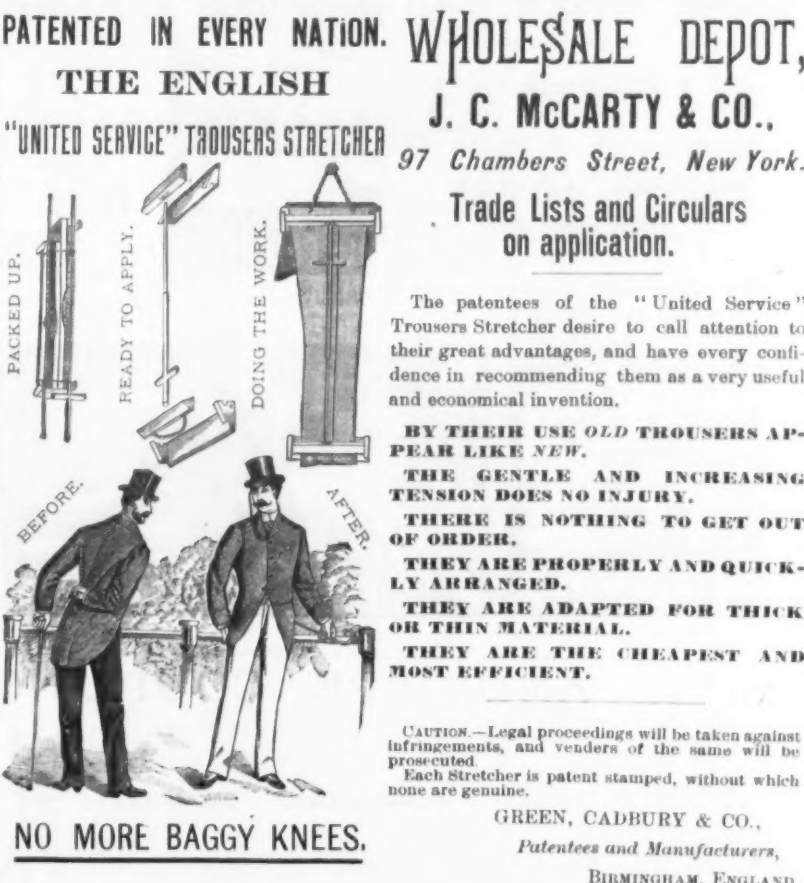
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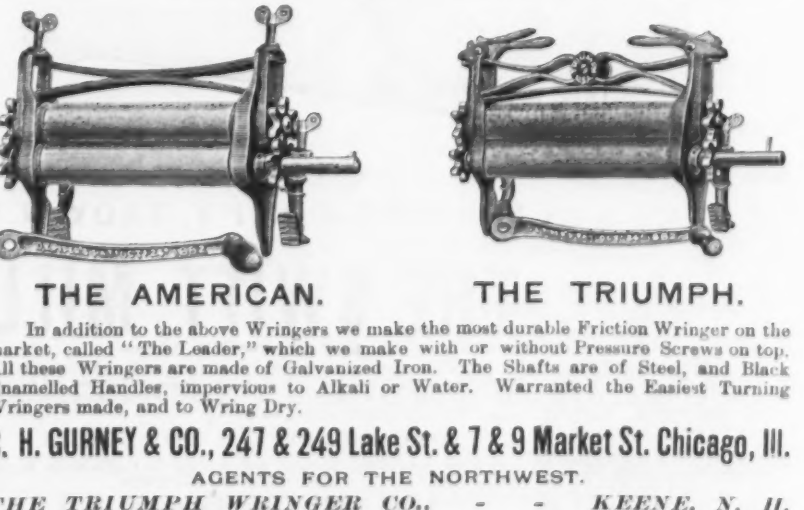
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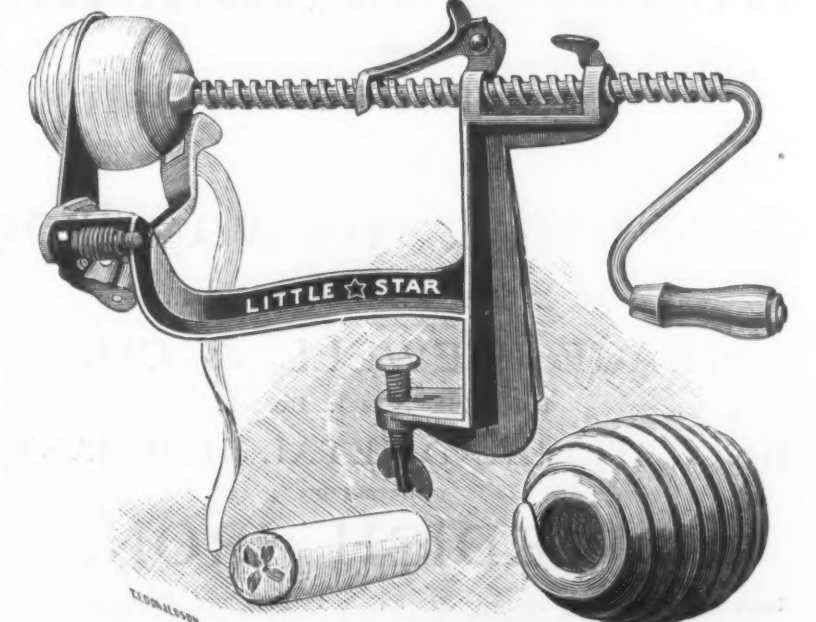
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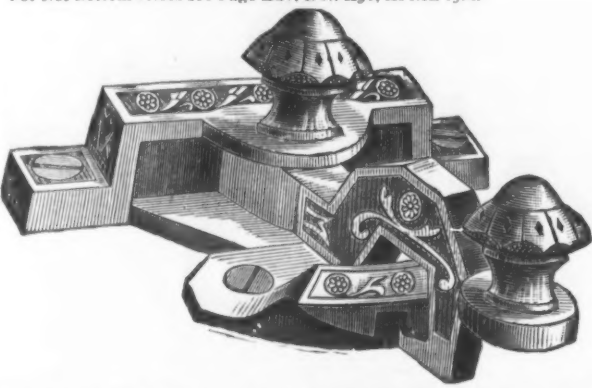
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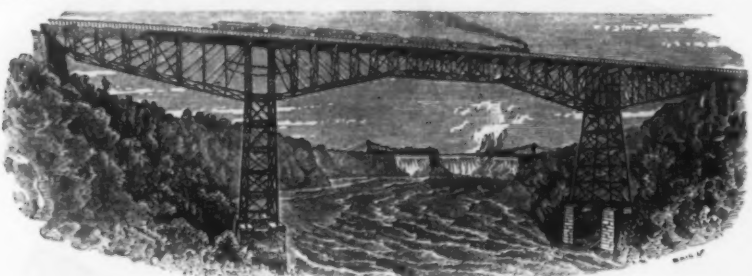


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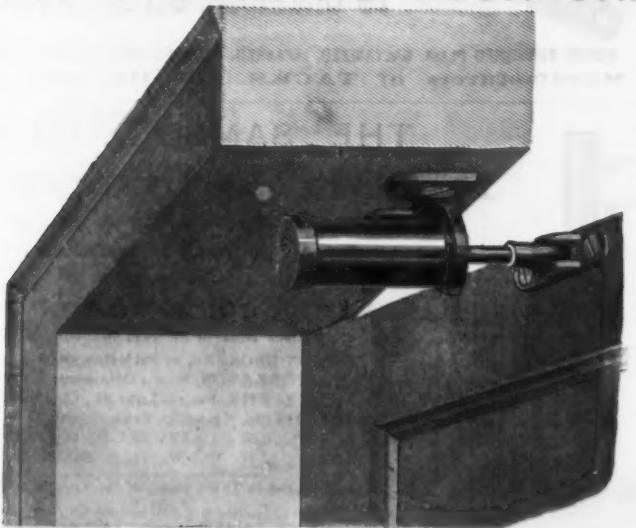
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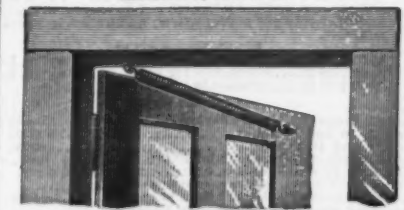
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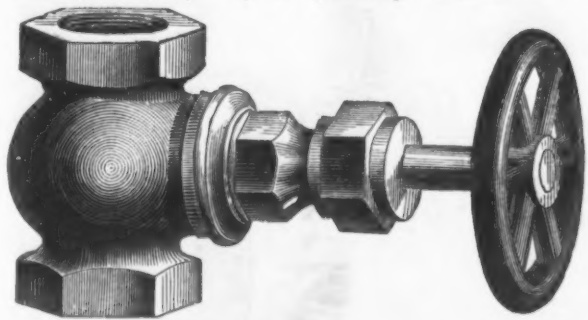
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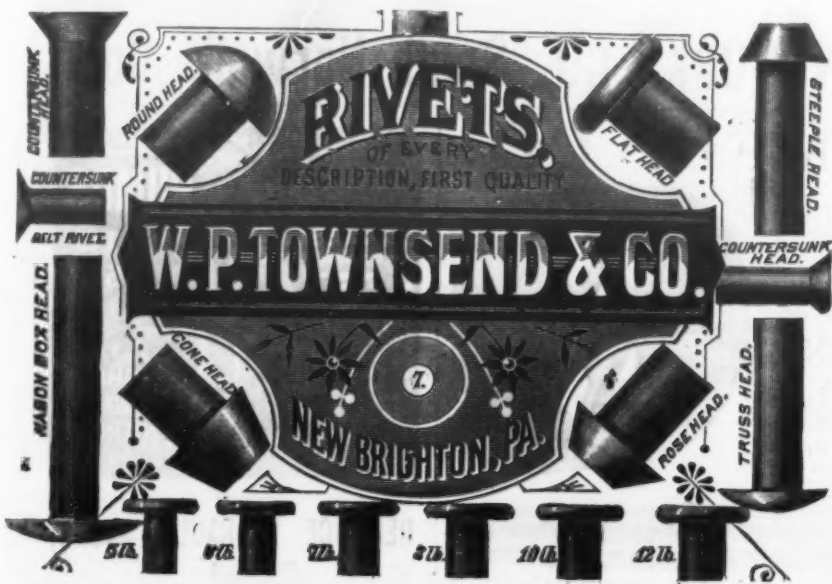
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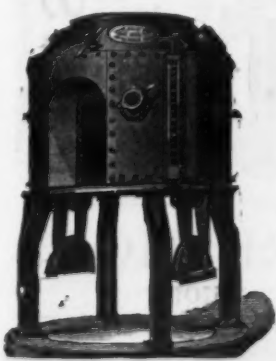


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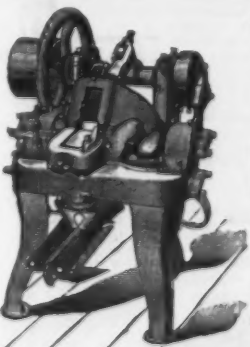


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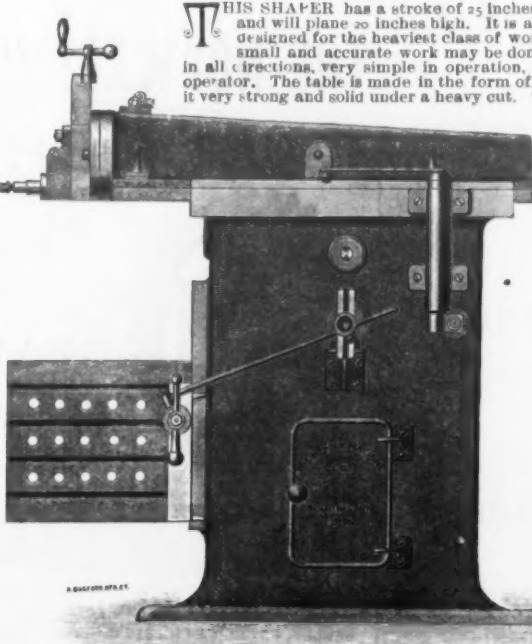
These Ratchets are made with Steel Screws, Pawls and Hardened Points. Handles and Nuts are of Norway Iron, Pawls and Ratchets of Steel, Forged, Solid and Milled Out.

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Weight of Machine, 2700 pounds.
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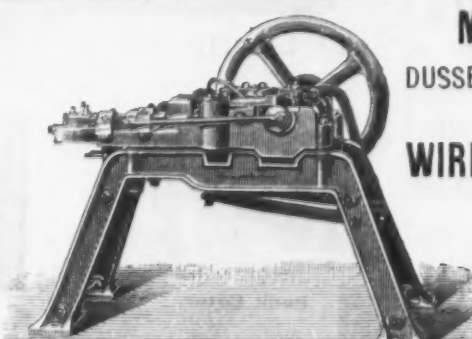


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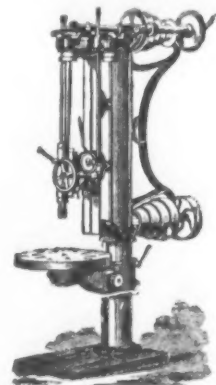
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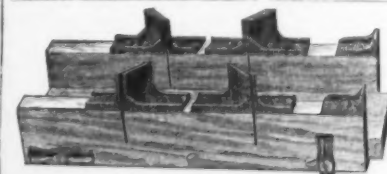
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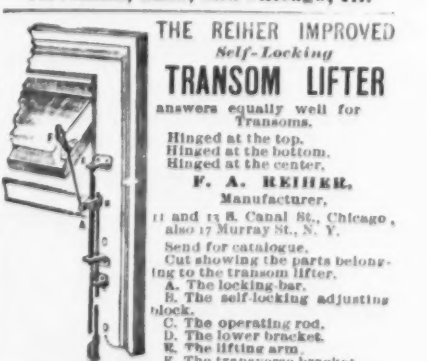
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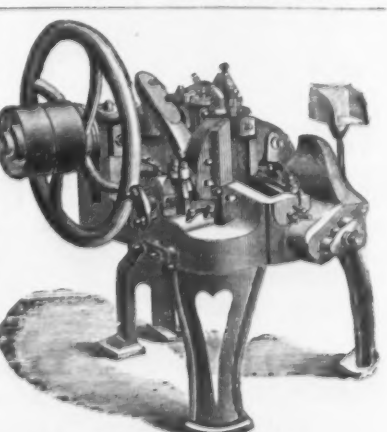


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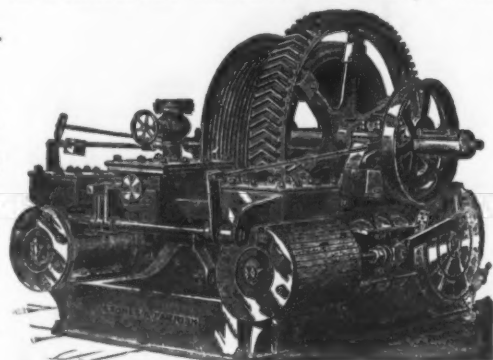


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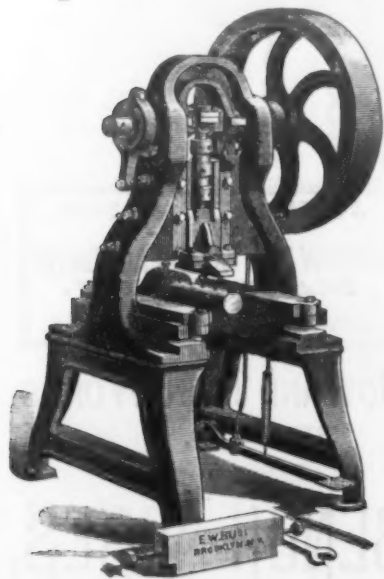
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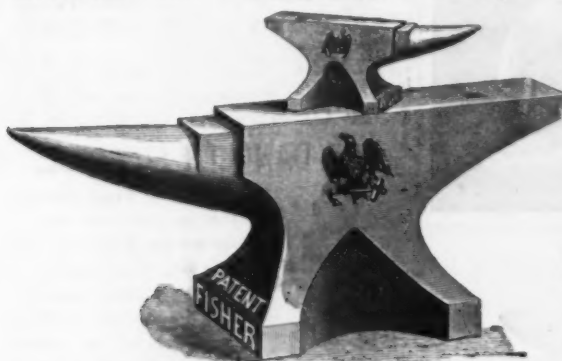
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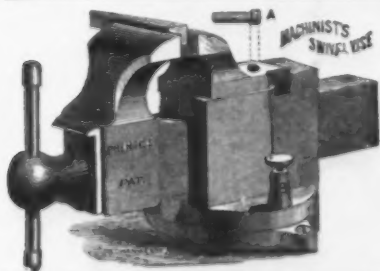
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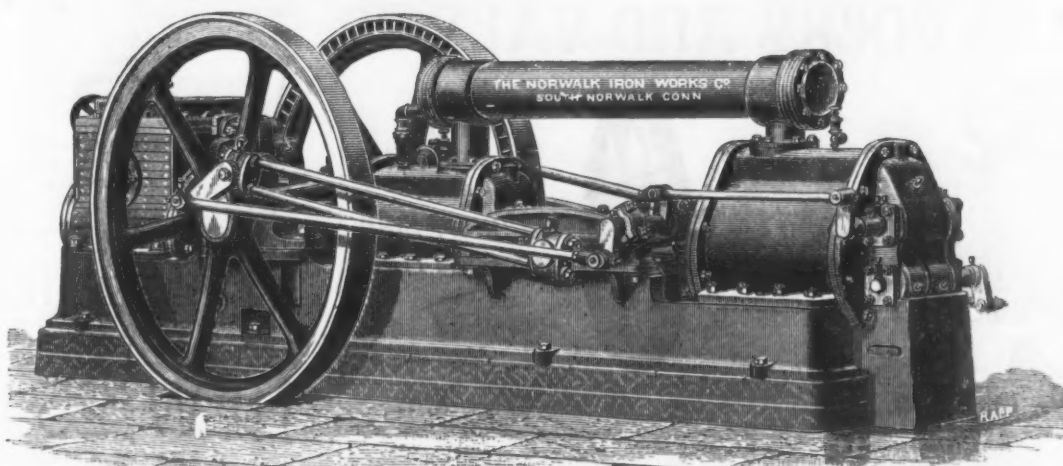
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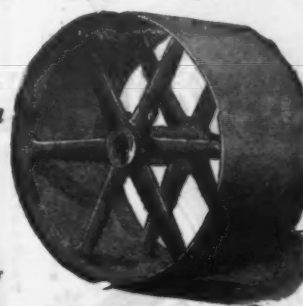
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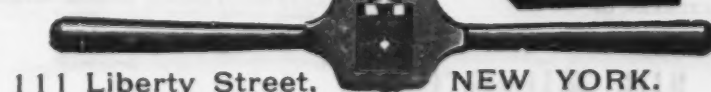
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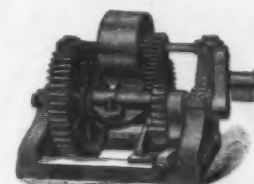


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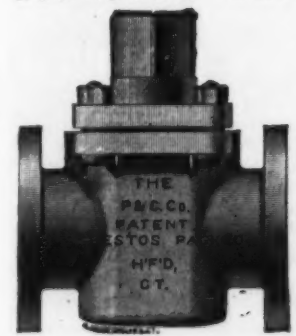


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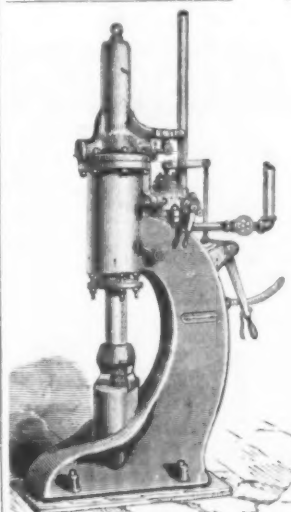
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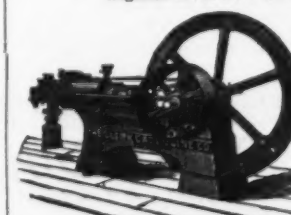
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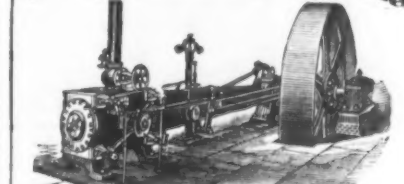
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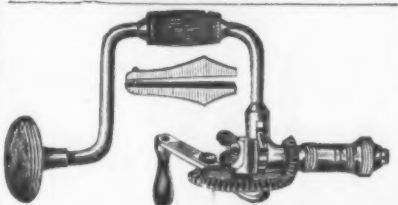
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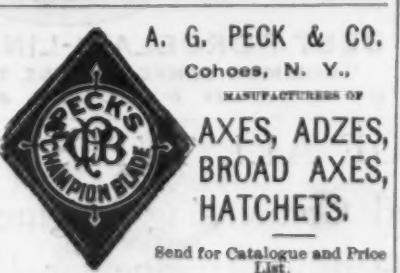
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he held up a patent door-spring he said:
"I buy him two days ago, and I like to exchange
him for a whetstone."
"What's the matter?"
"Well, I can't make him fit on my screen door."
"Why, that's the easiest thing in the world.
See here: This end screws on the door and that
end on the casing."
"I tried him dot way, and he doan' work."
"When it is on you take this metal pin and turn
the spring. See the holes there?"
"I does dot vhay, and my screen door flies open."
"You turned the wrong vhay."
"I turns him eafery vhay. Sometimes der door
vhas wide open, and all der flies in Michigan go in,
and sometimes he vhas shut oop so tight I can't
get in my own house. I begin on him in der morn-
ing, and I doan' leave off till night, but he won't
work right."
"That's curious. What tools did you have?"
"I use a hammer and screw-driver and cold-
chisel and saw and augur and crow bar and lots of
more, but he doan' spring for me. My wife works
at him, too, and my hired man he loose half a day,
and I vhas discouraged. I guess I trade him for a
whetstone."
"Well, I'll exchange with you, but I'm sure I
can show you how to adjust it."
"I guess I doan' try any more. You see, my
life vhas short, and I can't spare so much time
nit machinery. If I get a whetstone I doan' haf
to screw him on nor turn him round. Dere vhas
no pins or ratchets in his stomach. He vhas all
right, both ends oop. Maybe he doan' keep outd
flies, but he makes so trouble for me."
The exchange was made, and the man went
away light-hearted, calling back from the door:
"I can make outd a whetstone all right, and I
vhas obliged mit you. A whetstone winds oop
only one vhay."

GEM COAT AND HAT HOOK,
which, like a whetstone,
"WINDS OOP ONLY ONE VHAY,"
and has the additional advantage, a child can "wind
him oop."
Send for Samples and Prices.

VAN WAGONER & WILLIAMS CO.,
82 Beekman Street, New York.

NOTE.—We are credibly informed that the Door Spring above referred to was not one of our make.